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ALBERTA NATURALIST

VOLUME 9 NUMBER 1 MARCH, 1979

TABLE OF CONTENTS

Cover: Pika, by Susan Popowich, Illustrative Artist for the Canadian Wildlife Service in Edmonton.

FURTHER COMMENTS: SHARP-TAILED GROUSE RECORD, by Wayne C. Weber. 1

THE MOUNTAIN BLADDER-FERN IN ALBERTA, by D.F. Brunton . . . . . .

PROCEEDINGS OF THE ALBERTA ORNITHOLOGICAL RECORDS COMMITTEE, 1977-78, by Dr. Jim R. Salt 4

CENSUS OF TWO GREAT BLUE HERON COLONIES IN THE CALGARY AREA, WITH A DISCUSSION OF METHODS FOR FUTURE MONITORING, by R.M. Fisher. 6

RECENT PUBLICATIONS ON THE NATURAL HISTORY OF ALBERTA, Compiled by David Ealey 14

HIGHLIGHTS OF FALL BIRD MIGRATION, SOUTHERN ALBERTA - 1978, by Rudi Butot 17

OCCURRENCE OF THE BLUE JAY IN LETHBRIDGE: A POSSIBLE RANGE EXTENSION?, by Michael D. O'Shea 18

MAMMALIAN FAUNA OF THE KANANASKIS LAKES, UPPER KANANASKIS RIVER AND HIGHWOOD PASS REGION, ALBERTA, by Jim R. Salt and Robin Clarke 22

NATURALISTS' BOOKSHELF:

Wild Birdwatchers I Have Known, reviewed by David Ealey. 45

LETTERS TO THE EDITOR 47

FAN NEWS 51

PRESIDENT'S PAGE. 53

CLUB NEWS 54

CONSERVATION NEWS 56

NOTES AND NEWS 57

JUNIOR NATURALISTS' PAGE 59

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DEADLINES for submission of material are: January 15, April 15, July 15 and October 15. Details on back page.

IN COMING ISSUES

-Arrival and Departure Dates of the Birds of the Ft. McMurray, Alberta, Area, by J.R. Gulley

-Weedy Places and the Western Irrigation District, by Kevin Van Tighem

-Opportunistic Predation by a Black-billed Magpie on a Common Starling in Canmore, Alberta, by D.F. Brunton

-The Woolly Lip-fern (*Cheilanthes feei* Moore) in Alberta, by D.F. Brunton

-Skippers and Butterflies of a Prairie Farm, by Norbert G. Kondla

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FURTHER COMMENTS: SHARP-TAILED GROUSE RECORD

Letter Received January 19, 1979

"I am writing about the interesting note by Kevin Van Tighem in the December, 1978 Alberta Naturalist, entitled "Sharp-tailed Grouse Breeding Record for Yoho National Park, B.C." Contrary to the author's statement, this is not the first record of Sharp-tailed Grouse for the Park; in fact, Carson Wade's 1977 report on the birds of the Park, cited by Mr. Van Tighem, lists a sighting of a female Sharp-tailed Grouse accompanied by a brood of young, observed on August 30, 1966 by Malcolm McNab along McArthur Creek in the Park. Wade listed this sighting as 'hypothetical', perhaps because of the absence of other reports of Sharp-tailed Grouse in Yoho National Park and surrounding areas. However, Mr. McNab, who was Park Warden for the Ottertail district at the time of this observation, seemed to be quite familiar with the various species of upland game birds, and I feel that his identification can be trusted. Interestingly, the 1966 observation is the only about 13 km from the 1978 observation; perhaps Sharp-tailed Grouse have nested regularly in this general area.

The existence of this earlier record scarcely renders Mr. Van Tighem's observation any less noteworthy. Sharp-tailed Grouse are certainly a rare species in this part of the Rockies today, and evidently have been rare for many years. I did not see any Sharp-tails in Yoho National Park during the two summers (1966 and 1967) when I worked there as a seasonal park naturalist, nor have I ever seen one elsewhere in southern British Columbia during 16 years of widespread birding in the province (although a small breeding population occurs in the Merritt area).

Yours Sincerely,
Wayne C. Weber, Graduate Student
Mississippi State University, Dept. Biol. Sc.
Mississippi State, Miss., USA 39762

Editor's Note: Carson Wade also wrote pointing out this previous, hypothetical record for Yoho National Park.

THE MOUNTAIN BLADDER-FERN IN ALBERTA

by D.F. Brunton
Interprestive Coordinator,
Kananaskis Provincial Park,
Box 59, Canmore, Alberta TOL OMO

The Mountain Bladder-fern *(Cystopteris montana* (Lam.) Bernh.) is one of the rarest ferns in Alberta and has traditionally been considered a specialty of the Waterton Lakes National Park area (Moss, 1959). Until recently, it was known from two other locations in the province (Moss and Pegg, 1963).

It is a beautiful little plant with delicate, lacey, soft green fronds which are reminiscent of a tiny Bracken (*Pteridium aquilinum* (L.) Kuhn). It prefers

moist, heavily-shaded, calcareous sites such as deep limestone river canyons, dark spruce forests by mineral springs and, although occasionally found in stands of many thousands, it is always local in distribution. Nowhere throughout its boreal-sub-arctic range across northern Canada is it common (Argus and White, 1977; Boivin, 1967; Taylor, 1970). Inexplicably, however, it is omitted from the list of rare plants in Alberta (Argus and White, 1978).

Recent discoveries encouraged a review of the species' status in Alberta and that review turned up a number of unpublished stations. Figure 1 indicates the location of all Alberta stations of *C. montana*, and shows that far from being a "Waterton specialty", this fern is widespread in western and northern Alberta.

C. montana is most frequently found in more moist areas of the province. Although found along the length of the Rocky Mountains, it appears to be confined to those areas with relatively higher annual precipitation (e.g. Waterton Lakes National Park, Kananaskis Provincial Park and northern Jasper National Park). This situation is similar to that of the Northern Holly-fern *(Polystichum lonchitis* (L.) Roth) which was also thought to be a Waterton specialty and was recently found in a number of sites along the Rockies which exhibit relatively high precipitation levels (Brunton, 1978). In addition, several stations of *C. montana* are known from the relatively higher Swan Hills in boreal Alberta.

Alberta *C. montana* stations are documented by the following specimen and/or records:

(1) Otauwau River Brinkman 4211 (D A O) in 1929; (2) Deep Valley Creek Pegg 1084 (ALTA , D A O) in 1961; (3) Miette Hot Springs, Jasper National Park Cody 23063 (D A O) in 1976; (4) Maligne Canyon, Jasper National Park (Sight record) D.J. Brunton, September, 1976; (5) Windfall River Moss 12249 (U A C , D A O) in 1960; (6) Swan Hills Pegg 1337 (D A O ALTA.) in 1963; (7) Kananaskis Provincial Park Brunton & Paton 1447 (D F B , D A O , C A N) in 1977; and (8) Waterton Lakes National Park (In Moss 1959).

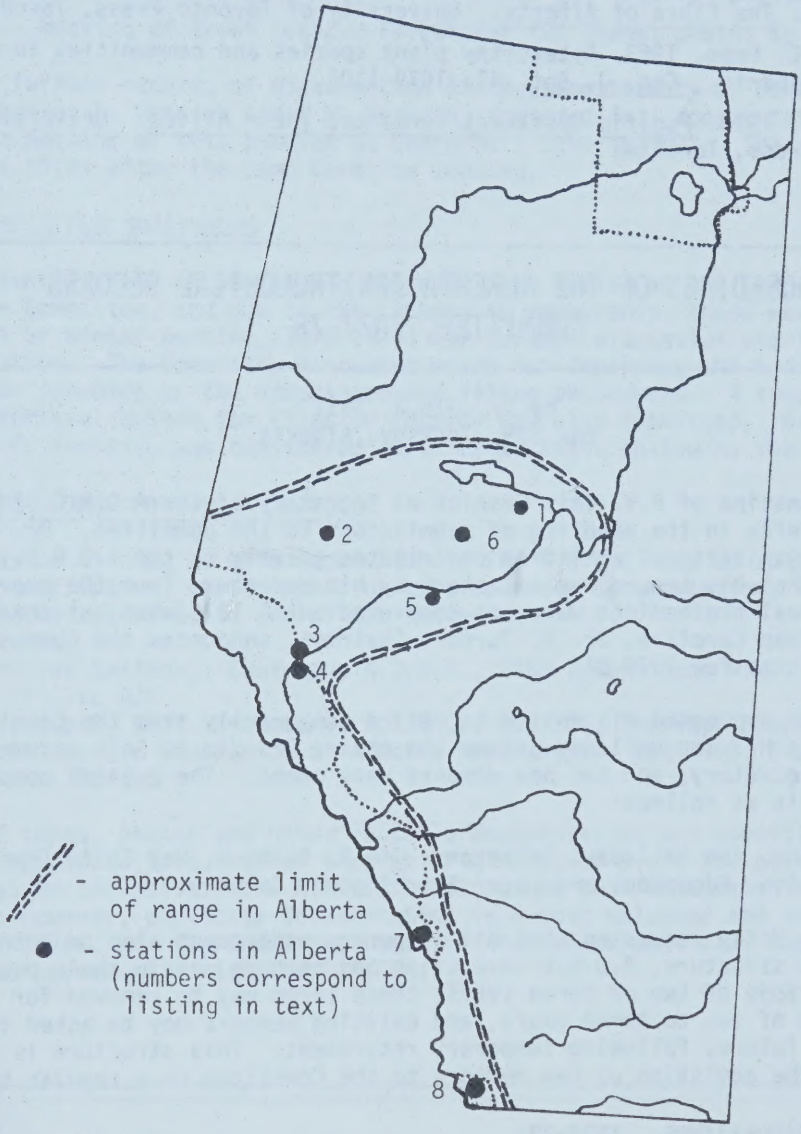
(Herbarium Acronyms: D A O - Biosystematics Research Institute, Agriculture Canada, Ottawa; C A N - National Museum of Natural Sciences, Ottawa; U A C - University of Calgary, Calgary; ALTA - University of Alberta, Edmonton; D F B - Herbarium of D.F. Brunton, Canmore).

The Mountain Bladder-fern should be expected elsewhere in the mountains and in higher elevation areas of boreal Alberta. This is most likely along the Continental Divide in areas of higher precipitation. It should certainly be found in Banff National Park ... probably in the Lake Louise or Palliser Pass areas.

ACKNOWLEDGEMENTS

My thanks to C.D. Bird and J. Packer, respectively, for the opportunity of examining U A C and ALTA specimens. W.J. Cody of D A O advised me of his collections and made information on them available to me. C. Frankton of D A O provided additional valuable assistance in obtaining literature. D. Paton of Kananaskis Provincial Park accompanied me in the field and showed me the Kananaskis station which he discovered. My thanks to all of these gentlemen.

FIGURE I. THE RANGE OF MOUNTAIN BLADDER-FERN IN ALBERTA



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PROCEEDINGS OF THE ALBERTA ORNITHOLOGICAL RECORDS COMMITTEE, 1977-78

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by Dr. Jim R. Salt
Box 239, Thorsby, Alberta

The resignation of D.V. Chip Weseloh as Secretary of the A.O.R.C. in 1976 caused some delay in the handling of submissions to the committee. Dr. Weseloh's energy and organizational abilities contributed greatly to the A.O.R.C., and it is regrettable that his tenure was cut short by his departure from the province. Reorganizational proceedings were not completed until 1978 when, at the meeting of 12 March at Camp Caroline, Dr. R. Turner, Chairman, announced the composition of the new Committee for 1979-81.

Dr. Turner expressed his desire to retire temporarily from the Committee, and requested that Mr. Ian Halladay assume the chair; Dr. Jim R. Salt assumed the position of Secretary; and two new members were named. The present composition of the A.O.R.C. is as follows:

Chairperson, Ian Halladay; Secretary, Jim R. Salt; W. Ray Salt, Edmonton; Cliff Wallis, Edmonton; and Peter Sherrington, Calgary.

Mr. Garry McKay requested that his temporary retirement also be accepted. Under present structure, A.O.R.C. executive and members retain their positions for fixed periods of two or three years; these terms may be renewed for an additional period of two to three years, and existing members may be asked to serve again in the future, following temporary retirement. This structure is designed to expedite the admission of new members to the Committee on a regular basis.

SPECIES SUBMISSIONS, 1976-78:

In the period from spring 1976 to spring 1978, submissions were received by the A.O.R.C. on six bird species. These submissions included five files discussed at the Camp Caroline meetong on 12 March 1978:

1. Clark's Nutcracker in Cypress Hills (Bob M. Fisher; photos)
2. Pygmy Nuthatch at Banff (G. Holroyd for Harold Mortimer; no documentation)
3. Nesting of Canada Warbler and Blackburnian Warbler at Slave Lake and Cold Lake (R.E. Gehlert; photos)

4. Long-tailed Jaeger at Beaverhill Lake (A. Wiseley; photos)
5. Nesting of Great Crested Flycatcher (K. Trann; photos to be submitted)

A further record, of Black-necked Stilt, submitted by D. Dekker, R. Lister, T. Thormin, L. Weseloh and D.V. Weseloh, included full documentation (photos, etc.) on the nesting of this species at Beaverhill Lake in 1977. This record was placed in the files after the Camp Caroline meeting.

UNCOMPLETED BUSINESS

Several items of continuing business were tabled at the Camp Caroline meeting of the Committee, and due to the changes in membership, these were left to an autumn or winter meeting (1978-1979) for further discussion and implementation or resolution. The Committee discussed means for improving the handling of submissions and for speeding up the acceptance and filing procedures. A sample computer storage and retrieval system for files or records was also submitted. Broadening of the A.O.R.C. function was considered at informal talks following the meeting.

SUBMISSIONS TO THE A.O.R.C.

Anyone wishing to make submission to the A.O.R.C. may do so by addressing a brief description, photographic or tape-recorded documentation, and other evidence of species recorded, to any of the following:

-Mr. Ian Halladay, Chairman, A.O.R.C., 2103 Crocus Road N.W., Calgary, Alta. T2L 0Z7
-Dr. Jim R. Salt, Secretary, A.O.R.C., Box 239, Thorsby, Alberta
-A.O.R.C. c/o Federation of Alberta Naturalists, Box 1472, Edmonton, Alta. T5J 2N5

If tapes, photos and other valuable documentation are submitted, they should be in duplicate form, rather than as originals, to avoid the possibility of damage or loss in the mails. The A.O.R.C. will return such documentation if requested to do so; however, duplicate documentation is a most welcomed and valuable addition to the files, and the Committee requests that where possible, such material be deposited permanently with the A.O.R.C.

OVERHEARD. . .

"A quarter of a century after the DDT break through, there are more insect species of pest status than ever before, scores of major pests have become resistant to insecticides."

Dr. Van Der Bosch, from Common Sense, Vol. No. 1, September, 1978

CENSUS OF TWO GREAT BLUE HERON COLONIES IN THE CALGARY AREA, WITH A DISCUSSION OF METHODS FOR FUTURE MONITORING

by R.M. Fisher
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Calgary, Alberta T2E 3A5

INTRODUCTION

There is a grave need for obtaining long term data on the productivity of animal populations, especially for fish-eating birds which are highly vulnerable to toxic chemicals (Vermeer and Peakall, 1977) and human disturbance (pers. comm. K. Vermeer, 1973). Colonies of fish-eating birds like the White Pelican *(Pelecanus erythrorhynchos)*, Double-crested Cormorant *(Phalacrocorax auritus)* and Great Blue Heron *(Ardea herodias)* should be monitored by censusing every 2-3 years in order to detect population declines in time to develop proper management techniques to combat such problems (Roney, 1978). Unfortunately, government wildlife agencies do not have the resources to provide this kind of coverage. Clearly the amateur naturalist can play an important role in providing the manpower to collect the needed data.

An interest in Alberta Great Blue Heron populations began in 1967, as part of a Canadian Wildlife Service program to protect endangered birds (Vermeer, 1969). Since then, selected heronries in southern Alberta have been censused in 1973 (Lang, 1974) and in 1974 (Butot, 1975) by local naturalists. The naturalists' objectives were basically to: (1) come up with a method that would produce useful data on the status (productivity) of each heronry, which could be implemented by amateur naturalists with a minimum amount of time and effort; (2) to examine the effectiveness and accuracy of that method; and (3) to examine the present level of protection provided for each colony.

The purpose of this article is to: (1) provide census data on the productivity of two heronries for 1978 that had previously been censused; (2) to compare the productivity with previous censuses; and (3) to discuss the validity of the previous proposed methods and arrive at a standardized procedure for monitoring Great Blue Heron colonies in the future.

DATA RELIABILITY

Before I give the results of the 1978 census, it is important to examine and identify the reliability of this kind of data that has been collected by naturalists. Butot (1975) censused three Great Blue Heron colonies in the Calgary area. No doubt with good intentions, his ultimate objective was to evaluate the accuracy of a methodology so that "amateur field naturalists" could use it to monitor the viability of heronries. Butot (1975) explicitly concluded that his methodology was valid to use for future studies by the "layman".

Unfortunately, Butot's (1975) preceding conclusions are derived from a false assumption. He stated (p. 247) "It was my intention to evaluate the accuracy of a method for the amateur, using only binoculars and telescope, which if it

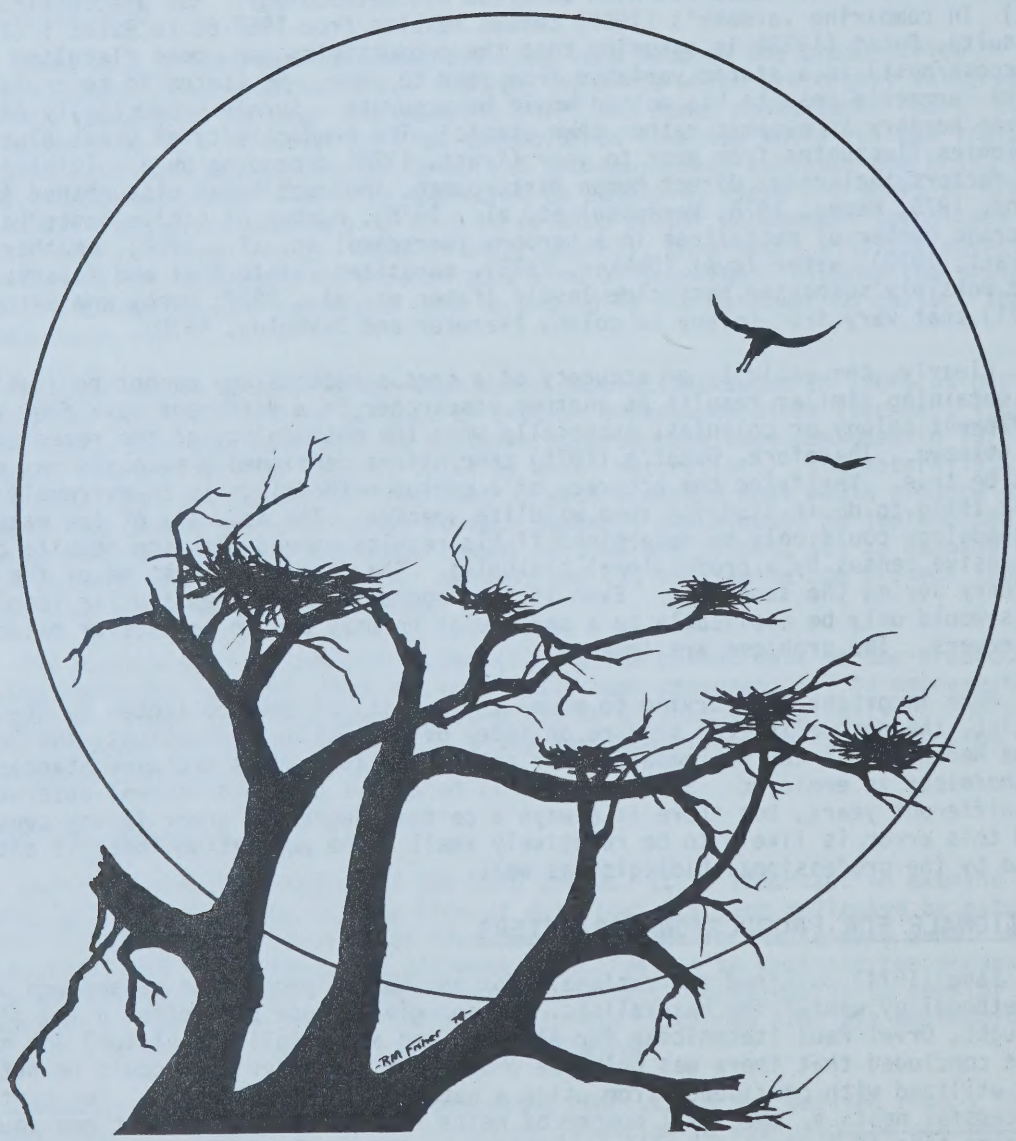
could duplicate the results of Vermeer's success ratio of fledged young per nesting pair as well as per successful pair for southern Alberta, would make unnecessary the entering of heronries for this purpose. If the method proved accurate then other amateur field naturalists could use it to monitor the viability of heronries. . .". Butot (1975) is therefore arguing that if he could produce similar results in his census as Vermeer (1969), then his own methodology is accurate. There are a few major problems with Butot's (1975) argument: (1) Vermeer's (1969) results may be just as subject to censusing error as anyone else's. How does Butot (1975) know they are a true indicator of the real productivity of a given heronry, especially when Vermeer (1969) does not even describe his methodology? How unscientific!; (2) In comparing Vermeer's (1969) census results from 1967-68 to Butot's (1975) results, Butot (1975) is assuming that the productivity (eg. mean fledgling success/nest) is a static variable from year to year. He stated if he could duplicate Vermeer's results his method would be accurate. Surely productivity of a given heronry is dynamic rather than static? The productivity of Great Blue Heron colonies fluctuates from year to year (Pratt, 1970) depending on a multiplicity of factors including: direct human disturbance, indirect human disturbance (Bjorklund, 1975; Henny, 1978; Werschkul et. al., 1976), number of active nests/ha and average number of nests/tree in a heronry (Werschkul et. al., 1977), weather (Pratt, 1970), water level (Dekker, 1975), parasites (Winterfiel and Kazacos, 1977), and possibly suspected pesticide levels (Faber et. al., 1972; Henny and Bethers, 1971) that vary from colony to colony (Vermeer and Reynolds, 1970).

Clearly, the validity or accuracy of a census methodology cannot be justified by obtaining similar results as another researcher in a different year from a different colony or colonies, especially when the methodology of the researcher is unknown. Therefore, Butot's (1975) conclusions mentioned previously may or may not be true. Verifying the accuracy of a census methodology is an extremely difficult thing to do in studying some wildlife species. The accuracy of the naturalists' methodology could only be determined if his results agreed with the results of an intensive census by a professional biologist. The comparison must be of the same heronry during the same year. Even if this comparison provided similar results, this would only be applicable to a particular heronry and to particular naturalist observers. The problems are immense.

More important than trying to equal the quality of data collected by the biologist, the naturalist can produce an index of population productivity for Great Blue Herons, that can be compared year after year as long as the same standard methodology is employed. Sure, there will be errors due to different observers in different years, but there is always a certain degree of error in any census and this error is likely to be relatively small. The population index is often used by the professional biologist as well.

RATIONALE FOR PRODUCTION PARAMETERS

Lang (1974) outlined the rationale for estimating production parameters using a methodology useful for naturalists. Having given these parameters a lot of thought, Orval Paul (technician for Alberta Fish and Wildlife Division) and myself have concluded that there was only one production parameter that could be obtained and utilized with confidence from using a naturalist's methodology. Per cent successful nests = the total number of nests that contained at least one young at some time throughout the survey, divided by the total number of nests that were known to be occupied (from a single census on the last weekend in May), subtract the number of obscure nests after the late May census (see calculation Table 1).


RM Fisher

The other production parameters such as number of young fledged/nesting pair and number of young fledged/successful nest can only be accurately measured by the detailed study done by a professional biologist.

Using the naturalist's methodology it is very difficult to obtain a standardized indicator of the number of fledged young. The date when this count is made is crucial to further calculations. A count of young per nest is the best indicator of the number of young fledged, when most of the young in the colony are at the "brancher" stage (able to climb out of the nest onto the tree limbs) (Henny and Bethers, 1971). Unfortunately, this date varies from year to year depending on several factors. From my experience I know that a count of fledged young on one day during this branching stage will vary greatly from a count the next day. This is because branchers are leaving the colony. The other problem is knowing which young come from which nest at this time of year, as the branchers wander from nest to nest. The problems are immense. The main problem is there is too much error involved in calculating the number of fledged young. The sampling error will likely be so high that the analyzer will not know if a change from one year to the next is due to a real change in the colony production, or just an artifact of the sample error. In calculating the per cent successful nests the sampling error is relatively small and should give a reliable indication of a true change in the productivity of a given colony from year to year. Evidence given by Lang (1974) and from my own experience suggest that a count of the number of nests known to be occupied on the last weekend in May is probably a good indicator of the number of clutches initiated for colonies in the southern part of Alberta. This date will likely vary slightly from year to year and from colony to colony depending on latitude and altitude, but as long as the same date is used from year to year, an index value can be obtained.

METHODS FOR 1978 CENSUS

Basically following the methodology of the previous heron surveys of Lang (1974) and Butot (1975), the author designed an instruction sheet with accompanying data forms. Volunteers were solicited from the Calgary Field Naturalists' Bird Study Group. From the six volunteers, Anne MacHin and Jamie Podlubny were assigned to the Bottrel colony (TP 28 R 3W5 S21), Ed Quist and Joel Duncan to the Carseland colony (TP 21 R26W4 S 23), and Jack and Mariane Stees to the Fish Creek colony (Fish Creek Provincial Park, Calgary). The Fish Creek survey was discontinued due to the difficulty of counting once the leaves came out.

The observer pair censused the given heronry five times: April 15 or 16, May 27 or 28, June 17 or 18, July 15 or 16, and July 22 or 23. One data sheet (see sample Figure 1) was provided for each census. Under miscellaneous notes the observers were asked to describe the condition of the nesting trees, adjacent land use patterns, human activities at the time of the census and the weather conditions for the past week before the census. The observer pair was encouraged to contact the owner of the land on which the colony was situated. From the author's past experience with censusing the colonies, the observers were advised as to the location which would be best for counting. The same location was used for each census. No censusing was to be done during inclement weather, and entering the colony was discouraged. It was recommended the observer pair spend at least four hours at the colony per census. The best time to make counts of nestlings is between 0600 - 1000 hours and 1700 - 2100 hours when feeding activitiy is most frequent. The use of a spotting scope was recommended but not essential.

FIGURE I. GREAT BLUE HERON COLONY SURVEY OF THE CALGARY REGION

Colony Name:_____ Survey no._____

Date:_____ Starting time:_____ Ending time:_____

Observers names:_____

Temp.:_____C Wind speed and direction:_____ Cloud cover:_____ %

Miscellaneous notes:_____

Total no. of nests:_____ No. of nests occupied:_____

Nest #	# of yng.	V.I.	Times of feeding	Nest #	# of yng.	V.I.	Times of feeding

On the first census a map of the nests in the colony was carefully drawn out in pencil on a piece of 9 x 12" stiff cardboard. Each nest was given a permanent number and drawn in approximate scale in its relation to the other nests. Any outstanding object in the colony was drawn in. It served as a reference point when trying to find out the number of a nest in the middle of the colony. A circle around each nest number was varied in size to indicate the relative closeness of the nest. The map was made large enough so that one could draw in new nests that were constructed after the first census. Counts of the total number of nests were made at least twice for each census, once by each observer until they both agreed. The number of nests occupied was defined as the number of nests with at least one adult bird present on, in, or just beside it. When counting the number of young in a nest it is not always possible to see all of the individuals. When an adult came to feed them, all the young were visible at a particular nest. This provided a check on the initial count. V.I. was a visibility index, which is a relative measure of how well the observer could see the nest at the particular census time (G-good, F-fair, P-poor, O-totally obscured).

RESULTS

A total of 52.75 and 36 man hours of observation was accumulated for the Bottrel and Carseland colonies respectively. The Bottrel colony was censused from a fixed point (cattle shelter) approximately 250 m north of the nests. At Carseland all censuses were done from a hillside approximately 150 m north of the colony. Table 1 summarizes the productivity parameters and how they were derived.

No outstanding human disturbances were reported for either heronry during the course of the 1978 survey. However, on June 22 a severe hail storm accompanied by

strong winds blew three nests down and killed several young at a heronry a few miles downstream from the Carseland colony (pers. comm., Orval Paul, 1978).

TABLE I. RESULTS OF THE 1978 GREAT BLUE HERON SURVEY

Production parameters	Bottrell	Carseland
maximum # of nests	51 (May 28 census)	27 (May 27 census)
# of nests known to be occupied (or clutches initiated)	50 (9 unknown*, 2 unoccupied) (May 28 census)	27 (May 27 census)
# of successful nests known	33 (7 omitted because of confusion, 3 obscure, 5 unproductive)	21 (6 obscure)
% successful nests	89 (33/(40-3))	100 (21/(27-6))

*these nests are further discussed in all following censuses

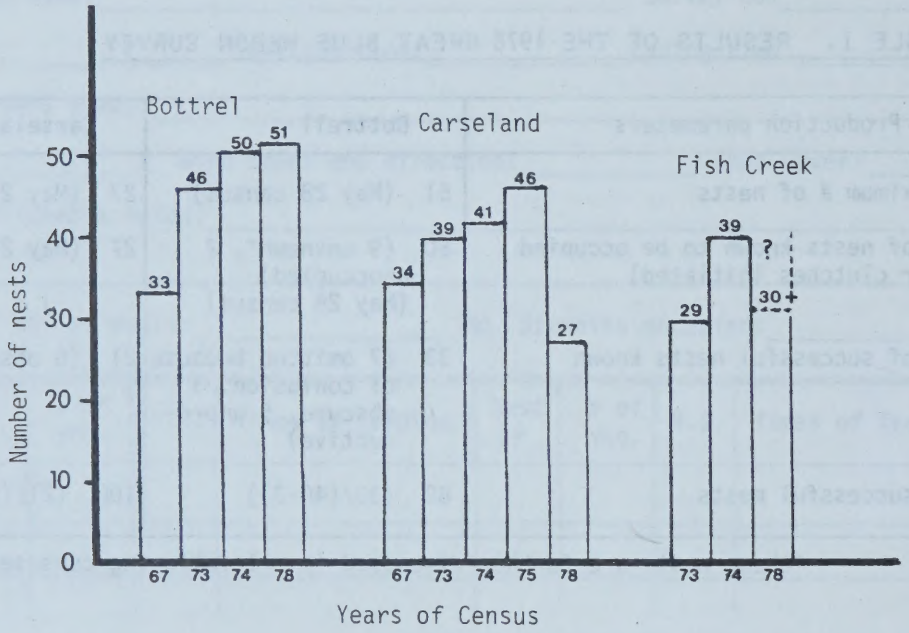
DISCUSSION

The following discussion consists of three parts: (1) interpretation of the 1978 survey results; (2) comparison of this data with previous surveys; and (3) a discussion of the problems of the 1978 methodology and its modifications with the purpose of setting up a future monitoring program.

Table 1 is mostly self-explanatory. The % successful nests is very high for both heronries. This is an indication (index) that almost all of the adult females were reproductively able to produce young and that there were no major negative factors that suppressed the fecundity so that at least one young was produced at some time during the season.

Figure 2 summarizes the trend of the number of nests from three heronries in the Calgary area, based on data from surveys done since 1967. This productivity parameter is certainly not the best index of colony productivity, but it is a measure of the general growth trend of a given heronry. Vermeer's (1969) results for 1967 may not be comparable with the other surveys. He did not specify when he did the count. The other surveys are comparable as the nest counts were done around the same time in May, when the maximum number of nests seem to be present. In general, the three colonies seem to have been growing since 1967 (excluding the Fish Creek heronry which was not surveyed then). This does not necessarily mean these heronries are producing more young. This type of information is unknown at the present time. The Fish Creek survey in 1978 unfortunately was abandoned (my idea) after an initial nest count on April 23. Therefore, it is most likely several new nests would have been added to this colony besides the 30 which I counted. It is obvious the Carseland colony has had a drastic decline (59 per cent) in the number of nests from 1975 to 1978. I have no explanation for this decline. This heronry should be watched closely in the future.

FIGURE 2. TRENDS IN NUMBER OF NESTS FROM THREE HERONRIES IN THE CALGARY AREA



1967 (Vermeer, 1969); 1973 (Lang, 1974); 1974 (Butot, 1975); 1975 (Fisher, unpubl.); 1978 (this census).

In general the methodology and rationale for production parameters in this 1978 survey proved to work very well. For the field observers there were some small problems (eg. eye strain, cold weather, chasing after Black-billed Cuckoos, etc.), but these were not serious. There was a slight problem in defining what is a heron nest and what is a hawk or abandoned magpie nest. It was also difficult to know whether to count a "nest" that was falling apart or only made of a few sticks. It was difficult in the late July census to know which young belonged to which nest. Such kinds of difficulties seem inherent in any field work. I left it up to the individuals' discretion to sort them out, as long as they told me what they did. I will stress here that it is of absolute importance that the field observers are intimately knowledgeable with the methodology before going into the field. The observers should record data from only one location throughout the survey. A detailed map of this observation sight should be included in the analysis of future surveys so that observers in future years can use this same site. I did not define the variables of the visibility index in this survey, but they should be defined as: Good (G) - nest is clearly visible; Fair (F) - nest is partially obscured but most of the nest contents are still visible; Poor (P) - nest is mostly obscured but some of the nest contents are still visible; and Obscure (O) - nest contents cannot be seen.

Although I designed this 1978 census for the purpose of collecting information on the # of fledged young/nesting pair and # of fledged young/successful nest, I

recommend, for the reasons given earlier, that these parameters be dropped in a future monitoring program. This will both improve the reliability of the data and the simplicity of the methodology. Therefore, a pair of observers will only have to go out on the following dates: third or fourth weekend in April (map out colony, count nests and make general notes); last weekend in May (count nests, count nests occupied); third weekend in June (record nests with young); and third weekend in July (record nests with young). In analysing the 1978 surveys I found it was best to discard any data that was confusing or obscure (V.I.).

It is inevitable that some heronries will not be as easy to census as Bottrel and Carseland. However, the best data that the field observers can get can still be used as an index. So don't get discouraged. The results I have presented in this study are hopefully the first of a series of such studies, using this standardized methodology. Only then can we look at trends in productivity from the index-like values produced. The methodology I presented here is probably going to be modified slightly over the years as more naturalists gain field experience with censusing heronries. To those who persue that course, I wish the very best!

I am convinced that the naturalists of Alberta can contribute to the management of the non-game wildlife resources of this province. The study of Great Blue Heron colonies using a standardized methodology is a good starting point to show what we can do. The Alberta Division of Fish and Wildlife has recently become interested in censusing colonial nesting birds in the province. Their biggest constraint is money and manpower. This is where the naturalists come in. The time is long overdue for naturalists and government wildlife biologists to remove themselves from personal emotionalism and begin to work together for the things they both really want to protect.

ACKNOWLEDGEMENTS

I would like to thank both Bill Lang and Rudi Butot for their insight and concern for the plight of the Great Blue Heron colonies in southern Alberta. I am greatly indebted to David Reid for assisting me in my field work with herons and to those veritable pious volunteers to whom the words "layman" or "amateur" can hardly do justice. The moral support and critical comments given by Orval Paul during the preparation of the manuscript will be long-remembered.

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OVERHEARD. . .

"Maybe we should heed the squirrel's example of living on what he saves rather than what he hasn't yet produced. . ."

by David Ily, from The Lethbridge Herald, October 17, 1978

HIGHLIGHTS OF FALL BIRD MIGRATION, SOUTHERN ALBERTA - 1978

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Early fall was marked by heavy rains and by mid-September, more than twice the monthly rainfall had already been recorded. October and early November were sunny and mild and, except for a few very short periods of hard frost, seasonal temperatures were mild. Waterfowl numbers were extremely low this fall, as had been the case throughout the summer.

A large cluster of twenty-three Common Loons was reported from near Morley on 22 October, as opposed to the usual one or two bird sightings. Reports of Whistling Swans were few this year, but the flocks reported contained large numbers of birds of the year.

The main reported movement of Rough-legged Hawks took place from 12 to 15 October. Snowy Owl sightings have been numerous this fall, with the first sighting coming rather early - 22 October - from High River. Several Hawk Owls were also sighted in the Bottrel/Water Valley area this fall. A dead Barred Owl was found nearly Morley on 12 November. Short-eared Owls continued the upturn in numbers which started last year, after a scarcity of sightings for a number of years previous.

A late sighting of 21 American Avocets in white winter plumage came from Milk River on 9 October. A Varied Thrush was reported from Cypress Hills 8 October. Common Raven numbers are continuing their upward trend in the foothills area from Cremona to Pekisko. The Northern Shrike migration was reported from early October on. Immatures were well-represented.

In early October large flocks of Western Meadowlarks and Horned Larks were reported from the extreme southeastern part of the province. A small flock of Yellow-headed and Red-winged Blackbirds lingered near Red Deer at least as late as 27 October. Yellow-rumped Warblers appeared to have had a good year, with numerous fall sightings, and Wilson's Warblers were a close second in reported sightings. The fall migration of Dark-eyed Juncos, White-throated and White-crowned Sparrows was very poor this year in the Calgary area. The large masses of tumbling flocks of Lapland Longspurs and Snow Buntings just were not there this fall, or if they were they did not get reported.

More detailed tabulations for the fall period can be found in the fall and early winter issues of The Calgary Field Naturalist.

OCCURRENCE OF THE BLUE JAY IN LETHBRIDGE: A POSSIBLE RANGE EXTENSION?

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According to Salt and Salt (1976), "the Blue Jay is a resident in central Alberta from the Peace River District, Lesser Slave Lake and Fort McMurray, south to about Red Deer". They report nesting records for Elnora, Beynon, Calgary and Okotoks but consider the jay only as a vagrant as far south as Brooks. Godfrey (1972) reports "a permanent resident breeding population breeding in central Alberta (East of the mountains), from the Peace River District and Fort McMurray south to about Red Deer".

The Blue Jay *Cyanacitta cristata* has occurred in Lethbridge on numerous occasions in the past but only as a sporadic visitor. These were probably reports of wandering juveniles or wintering adults, as none were seen during the breeding seasons. Most reports came from birdwatchers and local residents who feed birds.

LETHBRIDGE BLUE JAY REPORTS

1967 - On November 16, Dr. Alan Roberts reported 2 Blue Jays frequenting the area of the Federal Agricultural Research Station, at the east end of the city. They were reported to be feeding on corn in the gardens of local residents in the area. Dr. Roberts also had heard of 4 other jays in the area. He feels that the jays probably spent the winter in the Research Station area but he has no further data recorded. This area is well-treed with many conifers.

On December 3, Bob and Dale Blair reported the occurrence of 3 Blue Jays at their feeder for at least one month. One bird was seen also by a local biologist, Galem Armstrong, a neighbour who fed them as well. A large number of clear, detailed photographs were taken by the Blairs (see following page). Identification was further confirmed when one jay was later found dead.

1968 - At least 2 Blue Jays were reported by Dr. Roberts on April 24, again frequenting the area of the Agricultural Research Station. In his records, he noted that they probably spent the winter in the area.

1971 - 3 Blue Jays were seen by Dr. Roberts on October 15 at the Research Station.

1972 - On September 14, the Blairs again reported the occurrence of Blue Jays at their feeder. On November 16 Dr. Roberts heard one or more birds and saw one on December 29 at the Research Station.

1973 - The Blairs reported 3 Blue Jays at their feeder on September 30. They say that the Blue Jays have been appearing at their feeder sporadically since that time. Further observations were reported by four other parties: Dr. Roberts, Dr. Bob and Liz Hall, Helen Schuler and myself. A number of photographs were taken by myself. Since the September report in 1973, Blue Jays have been reported frequently in Lethbridge.

1973-76 - Examination of records kept by local observers show that Blue Jays were seen in the city, outside the breeding season, from as early as August until as late as April. Observations for 1973-75 came from the Research Station, the neighbourhood of Hendersons Lake, with two observations 15-20 blocks west of the lake at the residences of Betty Haig and Dorthy Clark. For 1976, 15 of 18

Blue Jay at feeder in Lethbridge. Bob and Dale Blair

observations came from these residences, indicating a movement into those areas where feed was available.

1977 - Since 1976, however, data points to the possibility that Blue Jays have become full time residents in Lethbridge. We have observations of Blue Jays for 10 out of 12 months of the year, being absent only in May and June. B. Haig reported a jay at her feeder on July 30 but says that they occurred frequently during the summer. Over 50 observations with as many as 6 birds may indicate permanent residency. Most observations were at feeders. A sighting at the Research Station indicates that they still frequent that area.

1978 - We have had reports of Blue Jays for every month with a total of 241 regular observations from January until December 15, with a regular occurrence of as many as 6 birds feeding at 5 local residences. We also have a sighting of a group of 15 jays in March by Jim Carpenter. The jays are reported to be eating peanuts and sunflower seeds with an obvious preference for peanuts, shelled or unshelled.

Observations of Blue Jays for the months of May through August indicate the occurrence of Blue Jays as summer residents and may even indicate the possibility of a breeding pair. For May there were 29 observations; 7 in June; 12 in July; and 29 in August. However, there is little doubt that the jays occurred at the residences of B. Haig, S. Arner, D. Clark and the Blairs more frequently than was recorded since it was the holiday season.

REMARKS

On April 16, 1978, while watching a pair of Blue Jays, I observed what may have been a courtship display. One of the jays (possibly a female) was high in a large Cottonwood. She began investigating an old bird nest, possibly for food, and calling continuously. She then flew to a nearby branch where she continued to call while looking in different directions. A second jay flew in (possibly a male) and immediately the female appeared to behave in a submissive manner, crouched down and extended her neck, at which point the male fed her. The female then flew off, followed by the male.

While following a group of 6 jays on April 23, 7:00 am, Herb Sivyer and myself again observed a food exchange similar to that of April 16. Later, at 8:30 am, while observing a pair of Blue Jays 6 blocks away, we witnessed 3 food exchanges within 5 minutes. During this period, one bird showed intense interest in a number of spruce trees, investigating them actively. We observed this pair until 10:00 am but there were no other jays around. This may have been a courting pair.

Food exchanges may be important in Blue Jay pair formation and pair stability. Wetmore (1964) describes a courtship behavior in which "the male ceremoniously feeds his mate". Kilham (1956) observes "one jay was observed to feed the other, a performance witnessed on subsequent days but not prior to coition". Bent (1964) also describes an observation of food exchanges by Hervey Brackbill in 1939. However, Bent feels that courtship may not be "a conspicuous feature of the bird's behavior".

Many hours were spent searching for a nest in Lethbridge during the spring of 1978, but we were unsuccessful. However, on August 2 the Blairs reported the appearance of what they described might be a juvenile Blue Jay. It was described as being smaller than the other jays and with incomplete head feathering, "as though it had been dunked in water". They reported the juvenile on 12 occasions until August 20. Interestingly, on July 20, 1978, B. Haig recorded one jay that looked different, as if it was molting its head feathers. Then on August 1 she reported that it has lost its crest. It did not grow back in until August 14. We don't know if these observations by the Blairs and B. Haig were of the same bird or of different individuals. The residences of Haig and Blair are approximately 7 blocks apart.

Recently, the Blairs have reported that individual Blue Jays can be identified by variations in the white patch on the upper breast. Normally, this patch is completely white, but they report that on one bird this patch is not complete but streaked. This bird is smaller and lighter in color than the other jays. I have seen this bird and the incompleteness of the white patch is noticeable.

Reports of Blue Jays outside Lethbridge have been sparce. On September 24, 1977, D.F. Brunton, Mary Dyer and Karen Grant (Brunton, 1977) sighted 2 Blue Jays in the campground area of Writing-on-Stone Provincial Park. These two birds were presumed to be migrating. During the winter of either 1977 or 1978, 2 Blue Jays were reported at Raymond, 20 miles southeast of Lethbridge. They stayed for only a few days. During the spring of 1978, there was supposed to be Blue Jays nesting at Magrath, 14 miles west of Raymond. However, I found no sign of a nest or birds. Recent reports from Coaldale, 8 miles east of Lethbridge, by Michael and Dianna Axtell, indicate that Blue Jays have occurred at feeders this winter. Two jays were reported on December 8, 1978, and 1 jay on December 16.

CONCLUSION

In the past, Blue Jays occurred in southern Alberta only as sporatic vagrants. Since 1967, however, these jays have been occurring in Lethbridge regularly as winter visitors. For 1978 we have evidence that Blue Jays are now year around residents in the city. An apparent increase in local population, observations of jays during the breeding season, courtship displays and reports of juveniles may present evidence that the Blue Jay has nested in Lethbridge. No nest, however, has been found.

There is no doubt that the Blue Jay has extended its winter range into southern Alberta and that a small population is resident within Lethbridge during the breeding season.

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MAMMALIAN FAUNA OF THE KANANASKIS LAKES, UPPER KANANASKIS RIVER AND HIGHWOOD PASS REGION, ALBERTA

by

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The present annotated checklist of the mammals of Kananaskis region derives partly from studies undertaken by Peregrine Research & Documentation Ltd. for the Resource Assessment and Management Branch of Alberta Parks, Recreation and Wildlife in 1976-77. Some additional data has been compiled from previous investigators, scientific collections, and subsequent field research. Various techniques were employed by the authors to inventory the mammals of the area, and to provide basic ecological information. Snap-trapping and other specimen collecting, live-trapping with ear-tagging and hair-clipping, photographic and passive visual observation, and fecal analysis were used in more than four months of intensive field work in 1976-77. The field observations and fecal analyses as well as other passive techniques continued periodically through 1978.

VARIETY OF ENVIRONMENTAL FEATURES

The topographic and environmental features of this region are varied and rich. While there are large relatively uniform forests, there are as well small, isolated or even unique features with a correspondingly unique fauna. One aim of the field investigations was to sample as many of these environmental types as possible. An elevational range of over 1500 metres, from 1540 m at the head of Lower Kananaskis River to about 2675 m at various sites above Highwood Pass, the Upper Kananaskis River and the Smith Dorrien River, was studied thoroughly, and some aspects of fauna at even higher altitudes were noted.

The principal features of the topography may be defined by reference to three mountain ranges and three drainage systems. On the east the area is bounded by the Opal Range, Mts. Elpoca, Rae and Wintour. To the south and southwest, the Elk Passes, the French Military group and associated passes form the divide and boundary between Alberta and British Columbia. To the west and northwest two major drainages - the Upper Kananaskis and Smith-Dorrien Rivers - flow into the central or core reservoir occupied by the Kananaskis Lakes. These two rivers are separated by the Spray and Battleship group of peaks, including Mts. Indefatigable, Invincible, Warspite, Black Prince, et cetera. The entire region drains into the central Kananaskis Lakes reservoir, then northward down the Lower Kananaskis River and valley.

As is so often the case in Rocky Mountain drainages, the upper streams are

more deeply and sharply incised, or "V"-shaped, and with little alluvial deposit, while the lower valleys are wide and "U" shaped, showing considerable alluvial deposition over old morainal or glacial features. The distribution of high ranges and peaks along the west, southwest and south has considerable influence upon the local climate. Weather is captured and directed southward and eastward by the French group and the divide range of peaks, to such an extent that the Elk Passes at the southeast end of this complex are often under a blanket of thick, low cloud when the remainder of the valley, from about one kilmetre north of the passes, is in full sunlight. The weather systems which traverse the divide and Elk Passes, running themselves out on Highwood Pass and Mts. Rae and Tyrwhitt, are responsible for a distinctive vegetation over some of this region.

The rather great elevational relief with deeply cut narrow passes and valleys creates a situation of highly protected or shaded (and often steep) topography in the subsidiary drainages. Snow accumulation may be high and melt slow in the late spring. South and west exposures are clear of snow long before those to the east and north; in many localities only a kilometre apart or less, the southwest exposures are snow free from one month to six weeks before the drifts are gone from the northeast slopes. At higher elevations such as the Aster Lake bowl, snow conditions endure into July and an early winter may set in again in September.

It will be obvious that average treeline and vegetation lines vary locally with exposure. Steepness of slope also plays a role in this regard. In view of the great disparity between adjoining or neighbouring localities in the Kananaskis, a brief descriptive catalogue of the floras and environments is given here, for those particularly interested in habitat-related studies.

IMMATURE OR REPLACEMENT PINE FORESTS

Lodgepole pine, to a height of ca. 10 m (3 to 12 m), is the most common forest of the region between the Kananaskis Lakes and the Opal Range. It is in most cases the result of burns in the early twentieth century and before. The matte or floor in the younger replacement pine woods consists of needles of pine, with varying quantities of common mosses such as *Polytrichum*, a few common lichen species - *Peltigera, Cladonia, Stereocaulon* and very small amounts of *Cetraria spp.* - and scant vascular matte, consisting of sparse grasses, occasional buffalo berry or juniper, fleabanes and asters, wintergreen and arnica. Orchids like calypso are rare. The substory of shrubs develops only where there is some die-off or blow-down of the dense slim pines. Deadfall is not common, except in localized areas of blow-down.

The mammalian fauna of these forests includes principally the transients, for there is little to attract and retain larger mammals or a diverse small-mammal composition. Red Squirrels, Deermice and a few Red-backed Voles, and less commonly Flying Squirrels, are resident. Mountain Chipmunks are found along the edges or interfaces with other environmental features. Snowshoe Hares may feed in these areas, but rarely find shelter sufficient for their purposes. Both deer species, Moose, Wapiti, bears and carnivores travel through them.

VALLEY MARSHES AND FENS

A distinction must be drawn, particularly for faunal purposes, between the marsh topography and that of the fen. The marshes are dominated by cattail with sedge and rush; grasses, dock (*Rumex*) and willow, with other meadow and wetland

Flying Squirrel. Photo by J. Salt

flora occupy the margins. There are relatively few marshes of the prairie or parkland type in the region, and they are nowhere very extensive. If examined in detail, each has its own distinctive flora, as well. At least one shallow pond-marsh is entirely vegetated by horsetail *(Equisteum)* and this group is found to a varying extent in all wetter areas. At low elevations - 1500 to 1850 m (5000-6000') - old, long-abandoned Beaver works have produced small cattail *(Typha)* marshes, some with deep ponds and backwaters, in which algal development is great. In a few of these, freshwater sponges were noted. At medium elevations of about 1850 to 2060 m (6000-6700') some small cattail marshes occur deep in mature or disclimax coniferous forest, without sedge or grass margins. The history of these features is not clear. At the larger marshes with interface region of sedge, grass and wildflowers or shrubs, the flora is abundant and diverse, as is the invertebrate life.

The mammalian fauna of these marshes is partly dependent upon the immediate surroundings, for chipmunks *(Eutamias amoenus)* and Red Squirrels stray into the wet areas to feed from nearby conifer or other woods. The Murids, or mice and voles, include Long-tailed and common Meadow Voles, Richardson's Vole, the Northern Bog Lemming and Heather Vole; Deer Mouse and Western Jumping Mouse *(Zapus princeps)* are casual to frequent. The principal shrew is the Water Shrew, but Dusky or Wandering Shrews *(Sorex monticolus)* were also found. Seasonal if not constant use is made of these marshes by Lynx, Coyote and Mink for hunting; by Wapiti, Mule Deer and Moose, and to a much lesser extent by a few White-tailed Deer, on a somewhat erratic basis. Short-tailed Weasel and Marten were found, or their sign noted, in some cases, more particularly in winter.

Fens consist of water entrapments which, like the marshes, are often attributable to Beaver, but in which drainage is either unpredictable or poor, and at times limited to evaporation. The wet parts of these areas are to a great extent filled in with mosses, on which a variety of sedges, wildflowers and shrubby plants have taken hold. There is often a succession of mosses from the wettest to the driest parts of the fen, with such species as *Calliergon, Fissidens,* and some of the Bryaceae in or by the water, and the hair caps *(Polytrichum), Dicranum, Pleurozium, Drepanocladus* and many other common species in the drier parts. A few species or groups are found from the wet up to the driest sectors. The sphagnums are generally rare here. The ground is often deeply hummocked and willows, shrubby cinquefoil, a shrubby birch *(Betula glandulosa)*, low scrub or individual fir and spruce, provide a canopy from 30 cm to about 1 m in height. Three-flowered avens *(Geum triflorum)*, violets, some bog orchids *(Habenaria hyperborea, H. dilatata)*, grass of Parnassus, white camas, butterwort, dewberry *(Rubus aculis)* and an array of asters and wintergreens, occur either generally or quite locally. The matte varies greatly in its moisture content. On open areas of well-saturated moss and vascular matte, dewberry is present; here, and around the springs or seeps which are frequent features of the margins, Labrador tea *(Ledum)* is occasional and purple laurel *(Kalmia)* may be found. In one or two fens, small open ponds of a few metres square, shallow (15 cm to ca. 1 m deep) and with quaking floating margins, contain very rich algal communities and even some cattail.

The most frequently encountered signs of mammalian habitation are the vole runways, and the track (with grazing or browse marks) of ungulates. Moose, Wapiti and some Mule Deer resort to these fens seasonally or periodically. The Murids include the Water or Richardson's Vole, a few Heather and Long-tailed Voles, and Bog Lemmings; Water Shrews and Wandering Shrews occur here; Mountain

Chipmunks and Snowshoe Hares use the drier margins and the dense willow cover for either sheltering or feeding purposes. Jumping Mice are common in the marginal areas where sedge-grass communities occur. Coyotes, Lynx and Short-tailed Weasels hunt through the fens and all of the larger mammals use them for travel-ways. The Moose is the most frequent ungulate, for the snow gathers in deep hollow drifts, caught by the shrub layer, and travel is difficult for less-specialized deer.

ALKLALINE PONDS

The region east of Lower Kananaskis Lake contains a number of shallow alkaline ponds, in which algae and aquatic mosses form a false bottom, and sedge, rush and grasses are virtually the only marginal species. In small bays and around inlet or outlet streams these sites take on the appearance of fens or seeps, with a more diverse flora. Bog orchids *(Habenaria)* may be found here, but shrub layer is absent or severely limited.

The summer mammals are also greatly limited: Jumping Mice use the margins, but little evidence of voles, and none of shrews, was noted at these sites. Ungulates avoided the water due to the quaking bog or quagmire of the shore and bottom. In winter, Wapiti visited the small cattail patches in bays, to scuff at and feed upon the higher vegetation beneath the snow. But sign of other ungulates and the carnivores was scant, and even the Snowshoe Hare seldom ventured onto the flat open surfaces in winter.

SUBALPINE/ALPINE CIRQUE MARSHES

The final aquatic feature of significance is that found at higher elevations, in cirques or hanging valleys of the region's principal mountain groups. Here, some elements of the valley marsh are mixed with some flora of the high damp meadows and drier slopes. Wildflowers such as arnica, aster and fleabane, sorrel *(Oxyria)*, umbrellaplant *(Eriogonum)*, leather-leaved saxifrage *(Leptarrhena pyrolifolia)*, and the rushes and sedges *(Kobresia, J. drummondii, Eriophorum scheuchzeri, C. nardina,* and several others) are common locally. The transition from the cirque marsh to the high subalpine meadow communities is sometimes gradual, sometimes quite abrupt, dependent upon topography; the marshes all differ if examined in detail. Certain features of the flora are shared by all, however. The floor or lowest part of these marshes is saturated matte in spring and early summer, drying slowly through July and August. Mosses, when they are present, may include the semi-aquatics like *Fissidens*, and the dry to damp species common in low alpine and subalpine heath, such as *Polytrichum*. The maximum height of plant cover is rarely more than a few centimetres - the willow, including *S. nivalis, S. barrattiana, S. barratiana X nivalis, S. arctica X glauca,* or similar hybrids, and even some rock willow, *S. vestita*, rarely grow higher than 35 to 45 cm. The crown of such shrub-layer is in the wettest areas, and maximum height of shrubs decreases markedly to the margins, where it may be less than 5 cm high. Dryas and the heaths or heathers *(Cassiope, Phyllodoce, Arctostaphylos)* are the cominant marginal matte, with moss and snow willow common.

These marsh/measows usually have very gradual slope, or are composed of terraces between short steep gradients. They may be treeless, or have a partial fir and larch verge if found at or below treeline. At highest elevations, the marsh vegetation gives way immediately to open rocky talus, boulder or scree fans.

Mule Deer female. Photo by J. Salt

Mammalian fauna occupying the cirque marshes depends in part upon the presence of natural or human disturbance, but in some at least, the populations of Richardson's Vole, with lesser species such as Bog Lemming, Heather Vole, Long-tailed Vole, Water Shrew, Jumping Mouse and even Deermouse, are quite high. The predators are transient. Short-tailed Weasel, Coyote, Lynx, Wolf, Wolverine, and Grizzly Bear all hunt through these regions, and the bears sometimes pause to dig extensively after voles in the wetter sites. Columbian Ground Squirrels are numerous at the edges. Ungulates, including a few Bighorn Sheep and even Mountain Goat females with young, as well as Moose and Wapiti, are casual to regular visitors. Moose in particular both traverse these sites and graze in them with regularity. In a few sites the Pika, the Hoary Marmot, Snowshoe Hare, Timberline subspecies of the Least Chipmunk, and rarer predators are found locally, the hares and rodents straying some distance from their home ranges to feed here.

SUBALPINE GROVELANDS AND MEADOWS

There are relatively large areas of semi-open groveland with small (1.5 to 3 m) larch, fir and spruce, and luxurient grass and wildflower growth to about 1 m in height, in the open spaced along the timberlines of the Kananaskis region. Most of the tree cover is alpine fir; Engelmann Spruce is occasional and larch appears just at local timberline (usually ca. 2150 m to ca. 2370 m) in mixture with the fir. The grass and wildflower component of the open woods or enclosed uplands is essentially that of the more extensive subalpine meadows discussed below. Although these grovelands are often in drier upper sheltered slopes or on open ridges, their dense, high ground-cover retains considerable moisture and the species of flowers and herbs, in particular, are typical of lower elevations. Such species as cow parsnip, *Heracleum lanatum*, and meadow rue, *Thalictrum sp.*, arnica, aster, and fine grass growth *(Bromus, Elymus, Agropyron, Poa,* et cetera) occur at relatively high elevations; on south and west exposures the glacier lily is abundant, and small species such as chickweeds and everlastings are common. Sedges are found principally at the dry edges of these locations, and sage also occurs in the dry margins locally.

The mammals of the subalpine grovelands are not particularly diverse, but they are of considerable importance. The Columbian Ground Squirrel seems somewhat atypical here, in deep grass and herb growth, yet it is common. Snowshoe Hares and Mountain Chipmunks are occasional, Porcupines are present, and a large variety of predators and ungulates make use of the grovelands to some extent. Wolverine and Wolf, Short-tailed Weasel and Grizzly, Cougar, Moose and Wapiti all were found with some regularity here, and female goats with young feed in and gravel through these areas. The small mammals include Heather and Long-tailed Vole, Bog Lemming, Deer Mouse, Wandering Shrew and Red Squirrel. Timberline Chipmunks did not appear to descend from higher elevations into these situations, but in one or two sites Hoary Marmots were seen.

The subalpine meadows, untreed and with very little shrub or other cover, consist of a thick long growth of those grasses mentioned above, with a wide variety of wildflowers. Often, two or more layers of plant growth could be detected, for strawberry and everlasting *(Antennaria)*, with some very stunted and obscured shrubs like juniper, buffalo berry, Saskatoon and localized rhododendron, were noticeable beneath the heavy grass overburden. Grasses are lodged to form this protective cover, by weight of snow and by wind, but between June and August or September there is a luxuriant erect stand as well, in which small

stream channels and a prodigious crop of fungi are hidden. Puffballs, genus *Calvatia*, were discovered here with a diameter exceeding 30 cm (12") and a few species of mushroom were also common.

The mammalian residents are for the most part those of the subalpine grovelands. Such species as the Snowshoe Hare and the Red Squirrel merely feed in these open meadows, returning regularly to tree cover. Columbian Ground Squirrels had well-developed labyrinths of dens and runways beneath the grass/herb cover, and the predators mentioned above in reference to the grovelands were often noted here as well, or their sign found. In early winter the Short-tailed Weasel also made extensive use of small tunnels and runways in the thin snow cover, leaving tracks everywhere. From trapping of the sites, the small mammal population did not appear to be high, for only Long-tailed Voles, Heather Voles and Wandering Shrews were found there, with the ubiquitous Deer Mouse. All exhibited considerable fluctuation in numbers at these sites, from year to year and season to season, shrews becoming particularly active in later August and September. Unlike the grovelands, which enjoy some tree protection, these meadows are bleak and windswept snow expanses in winter, often without track or sign of larger mammals for lengthy periods. Grizzly Bears, Cougar, Wolf, Wolverine, and Mountain Goats were associated with them seasonally, and all hunted or fed there.

MATURE/DISCLIMAX CONIFEROUS FORESTS

In the valleys, these consist principally of white spruce, with a minor component of lodgepole pine and alpine fir. On the steeper and higher slopes, the fir becomes dominant. Deadfall is usually very heavy, and the understory may consist of some buffalo berry, juniper, young shrub fir and seedling or regrowth fur to about 2 m in height, or there may be extensive growths of menziesia and rhododendron. The matte or floor is frequently of diverse mosses including *Pleurozium, Aulocomnium, Bryum, Brachythecium, Drepanocladus,* and many others - specific composition dependent upon the site. Common lichens are less variable, and such groups as *Parmelia, Parmeliopsis, Cetraria pinastre, C. tillesii, Usnea, Physcia,* et cetera, are found on trees, fallen logs, and vegetal matter while *Peltigera* and *Cladonia* of various species become quite extensive on the ground. Both lichens and mosses are in some places rather isolated according to species or species-groups. Extensive areas of *Tillium* and *Peltigera* can be noted, for example, where other species are unusual. The reasons for such grouping were not explored.

The mammalian fauna of the interior of these forests is more limited than might be expected. Deer Mice, Red-backed Voles, and rather rarely other species such as Long-tailed and Heather Voles, occur. Marten, Short-tailed Weasel, Red Squirrel, Snowshoe Hare and rather few larger mammals occupy these forests to any extent, although Grizzlies, Black Bears, Coyote and Wolf, Lynx and Cougar, hunt through or in them. Fishers were found here infrequently. Hibernating sites of Black Bear were thought to be concentrated in one or two old disclimax spruce/fir forests.

ALLUVIAL AND SLIDE FANS

These two general types of surface topography are grouped simply because their dominant fauna are often similar, as are the dominant flora. The tree species may be entirely different, either deciduous (chiefly aspen or balsam poplar, willow and buffalo berry, et cetera) or an open mixture of lodgepole pine and deciduous woods. The ground matte is meagre, consisting of grass or of some irregular

ground shrub such as juniper. The soil is rarely well-developed organically. On the valley floors, this is due to the recent or periodic inundation by rivers, streams or unconfined spring runoff. On the valley walls, it is due to a slow but regular shifting of the fine scree either just beneath or at the ground surface. Willow species include the larger tree-like ones, or *Salix bebbiana, S. arbusculoides, S. pseudocordata (?)* - the species were not defined during studies.

The mammals of these sites vary according to elevation and exposure of the slope. Columbian Ground Squirrels are present where there is soil for burrowing, or a sufficiently porous talus for natural dens. Mantled Ground Squirrels and Mountain Chipmunks occupy the more rocky and bouldered sites, or edges of such features. Snowshoe Hares are occasional. The voles and mice may be quite abundant, principally at low and medium elevations, and consist largely of Deer Mice and Long-tailed Voles. The Coyote, Short-tailed Weasel, and Marten may hunt in such sites, and ungulates like Bighorn Sheep, Mule and White-tailed Deer, Wapiti and Moose, may depend on these areas for seasonal sustenance when snow cover in valley bottoms becomes excessive. At medium and higher elevations, where slide fans adjoin more recent and coarser talus or boulder slopes, Pikas and even Hoary Marmots can be found, but these species seldom find sufficient shelter in fans to take up permanent residence. Rarely, Porcupines were recorded here as well.

SUBALPINE AND ALPINE ENVIRONMENTS

It is difficult to separate or distinguish between alpine and subalpine in the Kananaskis region, and in fact there is little true, isolated and specialized alpine flora or fauna. Vascular vegetation matte extends in some localities to above 2550 m (ca. 8300'), and the lower subalpine species are found, usually much dwarfed and generally with less diversity and luxuriance, in these higher situations. Saxifrages *(Saxifraga oppositifolia, S. lyallii, S. adscendens,* and false or leather-leaved saxifrage), drabas *(D. incerta, D. crassifolia, D. nivalis,* et cetera), some cinquefoils, asters and fleabanes, occur to very high elevations, and a few less usual species, such as hawksbeard, *Crepis nana*, appear rarely or in widely separated locations far above the vascular matte, to 2500 m or so. Mosses become extremely localized as well, consisting primarily of *Grimma* and *Polytrichum*. Lichens may be abundant on the rocks, but the "alpine zone" here is usually simply a thinning of the matte until it no longer occurs except as patches of individual plants or plant groups on an often somewhat mobile surface.

In contrast to this general situation, there are a few small areas in which specialized flora occur in truly alpine environment, with open sedge meadow, or high ridges of sparse saxifrage, clumped sedge, draba and moss campion. Goats and Timberline Chipmunks reach their limit of habitation here (although male goats commonly travel at altitudes of over 3000 m). Like the flora, the fauna becomes much diminished in numbers and individual voles or mice may occupy very large territories. The Heather Vole and Deer Mouse are the only commonly-found species. No evidence was noted of the carnivores such as Short-tailed Weasel, Wolf, or Marten, and Cougar, Grizzlies and most ungulates were only transient there. Neither Pike nor Hoary Marmot were found at these elevations. Bighorn Sheep and Mountain Goat males spend rather more time in these high places, where escape terrain is usually very near and extensive.

MISCELLANEOUS ENVIRONMENTAL TYPES

The diversity of the region is barely touched by the list above, and visitors will find that many small niches of mixed habitats or floras and faunas have not

been mentioned. Wet dense fir forests occur on some north-facing slopes near the British Columbia boundary; in old slide slopes dense shrub fir, some 1 m in height, forms an almost impenetrable barrier and provides cover for its own mixed fauna. Seep areas, in or at the margins of other environmental types, are often endowed with a much richer mammalian community than is found in any of the "pure" environments. No doubt, more detailed and thorough studies will reveal particulars of faunal ecology not noted or even implied in this brief catalogue.

CHECKLIST OF THE MAMMALS

Masked Shrew, *Sorex cinereus* Kerr: Only 1 specimen (Subad. female, 22/8/76) of this shrew was found; in an area of dry dense young pine woods.

Dusky Shrew, *Sorex monticolus* Merriam: Although considered to be a common shrew in the Rockies (Soper, 1964), few records were obtained for this species in the Kananaskis region. One specimen was taken and several caught by hand in long grass and willow, at the edge of damp ground but generally in dry situations.

Water Shrew, *Sorex palustris* Richardson: The Water Shrew was found almost everywhere at lower elevations (to ca. 2000 m) in the central Kananaskis region, along the edges of streams where either rock, earth debris, or vegetation and roots provided sufficient cover. An apparent peak in breeding activity occurs from late June to early July; a lactating female bore placental scars on 5 July; adult males were still active on 14 July; but after early August the shrews displayed no internal or external signs of breeding.

Bats are particularly scarce in the region; very few records were obtained. It is speculated that those observed were individuals moving to and from summering locations elsewhere. Potential roosting spots were investigated (Boulton Creek cabin; the blistered bark of standing burn trees, et cetera) but no indication of occupation was noted.

Little Brown Bat, *Myotis lucifugus* (LeConte): Several autumn records (late September) of individuals flying north down the central axis of the Lower Kananaskis were obtained in 1969, 1972, 1973 and 1977; there were no certain records for 1976.

Silver-haired Bat, *Lasionycteris noctivagans* (LeConte): A bat was observed near mid-day on 24 June 1976 near Lower Kananaskis Lake, and from shape, colour and flight, was identified as this species.

Big Brown Bat, *Eptesicus fuscus* (Palisot de Beauvois): An individual was noted once in spring (18/6/76) flying southward down the shore of Lower Kananaskis Lake. This species was seen a second time, during the early evening of 22 August 1976, in association with 2 or 3 other bats.

Hoary Bat, *Lasiurus cinereus* (Palisot de Beauvois): One Hoary Bat was sighted (18/6/76) in a small group flying southward, Lower Kananaskis Lake; the group included 1 Big Brown Bat and several small individuals, probably Little Browns.

Pika, *Ochotona princeps* (Richardson): Pikas inhabit the older, more settled slump-slopes and rock slides, coarse talus slopes and boulder fields at medium to higher elevations along the ranges throughout the region. Their diet is variable, dependent both upon seasonal availability and upon locally dominant species. Non-vascular plants *(Peltigera, Cetraria, Usnia;*

Pleurozium, Polytrichum, Grimmia) were found in food piles, but their purpose was not clear; fungi *(Boletus)* on the other hand had been partially eaten. Some fern *(Woodsia)*, mountain sorrel *(Oxyria)*, umbrellaplant *(Eriogonum)*, valerian *(Valeriana)*, and, less commonly, cuttings of branch or tips and cones of spruce, fir, pine and some currants *(Ribes)* were all recorded in piles over a layer of dead grass and sedge. Pikas were in full breeding condition in late June and early July (1967, 1974, 1976, 1977). Immatures, approximately 2/3 grown and distinguishable from adults by size, and by paler colour, were observed between 28 June and 5 September 1976. Although Pikas were active in winter, they generally remained below the surface, even at sites which were free of snow.

Snowshoe Hare, *Lepus americanus* Erxleben: Common at lower elevations in the central axis and outer valleys of the region (1975-1978) but were still regularly encountered at elevations to 2300 m. Hares were found in every type of environment - from marsh or fen to mature conferous forests. Numbers seemed to peak, however, in young dense pine stands and birch/willow fens. Summer foods included a wide array of grasses, herbs and flowers, and the buds and leaves of such shrubs as *Salix, Menziesia* and *Rhododendron*; the bark of aspen and the tips of conifers; selection being determined by seasonal availability. Conifer bow tips (primarily pine, but with some spruce and fir as well), the bark and tips of willow, birch and other less common shrubs, were the principal components of the winter diet. Mating was noted from mid or late March to early June; an immature about 2/3 grown was discovered, in the Elk Range vicinity, being attacked by a Short-tailed Weasel (17/7/76); and an immature about 2/3 grown was found dead on a road on 19 August 1976. No evidence of later breeding was noted. Evidence of predation by the Short-tailed Weasel, raptors (Great Horned Owl), and the Coyote and Wolf was noted. Hunting activity by Lynx and Cougar was indicated by tracks, but there was no evidence of kills. A progressive reduction in diurnal activity occurred from the summer, when hares were particularly noticeable, to the winter, when most hares kept to dense shrub cover during the daylight hours but wandered greatly in the open at night. By late October and early November (1976, 1977), hares were in almost complete winter pelage, with only a slight infusion of brown over the back. The last visual observations were on 13 and 14 March 1977, at which time the animals were still entirely white.

Least Chipmunk, *Eutamias minimus oreocetes* Merriam: The only form of the Least Chipmunk in the region; described by Soper (1964) as the "Timberline Chipmunk"; present only in a very few sites at high elevation (above 2300 m). This distinctive race is exceedingly pale gray on the back and sides except for a bright orange or russet semi-circle on the side of the mid-belly. It appears to be ecologically isolated from the Mountain Chipmunk *(E. amoenus)* in the region. This species is primarily a seed-eater, gathering and storing large quantities of mountain avens *(Dryas spp.)* seeds, and those of various subalpine/alpine grasses and sedges, and many other subalpine herbs. One specimen, an adult female lactating and with 6 placental scars, was taken 29 August 1976, from the east cirque above Highwood Pass. This late date for lactation indicates that breeding occurs as much as 6 weeks later than in the Mountain Chipmunk. Dates of emergence from hibernation are not specifically known, but no sign of the species was found in mid-May (1978) at this site, while much activity was noted from 11-16 June (1978); tracks in snow were recorded in late September (26/9/76) and in early November (2-3/11/76) and individuals were noted in October at one or two sites.

Mountain Chipmunk, *Eutamias amoenus* (J.A. Allen): The race of this species in the Kananaskis region is *E. a. luteiventris*; it is common to an elevation of ca. 2100 m. There is little habitat specialization; a preference is shown for dry situations at the edges of clearings, in gravel pits, slide and slump slopes, et cetera. Grass and dandelion seed, seed of *Hedysarum* and *Dryas*, as well as those of common herbs and wildflowers are gathered and stored. The chipmunk also entered wet willow-marshes to gather seeds of sedges; stems of *Pedicularis* were cut but the seeds did not appear to have been taken. Willow seed was a casual food. Birth of the first young probably occurs as early as 10 to 15 June although lactating females were not noted before 23 June (1976). No lactating females were found after 10 July at lower elevations, nor after 17 July at the medium elevations. Most Mountain Chipmunks had gone into hibernation by early October (1976, 1977); two later records were obtained, however: 29/10/76 and 3/11/76.

Hoary Marmot, *Marmota caligata* (Eschscholtz): Occurred in small family groups or communities at many isolated locations in the high subalpine and lower alpine zones. Most information is derived from the east cirque above Highwood Pass, where populations were high; in an area about 38 ha or less, at least 6 pairs of adults, with an average of 2 young per pair, were observed in 1976. Immatures were first noted about 19 August (1976). These younger animals fed vigorously on lower slopes while yearlings and adults spent much time sunning. Feeding time and "time out" on the slopes decreased in adults during the 2 to 4 weeks prior to hibernation. By 29 August (1976), few adults remained, while the young were evident everywhere. No marmot, of any age, appeared by 25 to 27 September, in spite of fine warm weather. In spring emergence, the marmots seemed to appear over a long period from late May through mid-June (1976, 1977, 1978); populations appeared to decrease in this site from 1976 to 1978. Golden and Bald Eagles were observed hunting Hoary Marmots; there was also evidence of mammalian predation by Lynx in Upper Kananaskis River on Mt. Putnik.

Columbian Ground Squirrel, *Spermophilus columbianus* (Ord): Abundant over the entire area, wherever minimal conditions permit; these ground squirrels were found even to elevations exceeding 2500 m. Many kinds of vegetal food are eaten at least in small quantities - dandelions are favoured, subalpine herbs *(Eriogonum, Erigeron, Oxyria,* et cetera) and some grasses and sedges are used extensively. Near Highwood Pass a yearling ground squirrel was found 3 to 3.5 m up in a larch tree, where it was having some difficulty grasping the branches, feeding on the tender new growth. Some common mushrooms *(Boletus spp.)* were eaten *in situ*. Hibernating ground squirrels emerge from early May through mid-June in this region, emergence depending upon the elevation and exposure of the home range. Marking and recapture suggest that old males are the first to emerge, followed within 7 to 12 days by older females; yearlings emerge with or just following the females, and may not breed immediately (as the adults do). No immatures were noted anywhere prior to 10 July (1976) and 6 July (1978), after which time they were present on almost all sites monitored. Spring yearlings can be distinguished from older adults on the basis of weight along - approximately 100 to 125 g separates the two age classes at time of emergence. From an average 200 g when they first emerge from the dens, the yearlings approximately double their weight by the time of hibernation. Adult males, in all communities studied, appeared to withdraw either soon after breeding or soon after the emergence of young from the natal dens, and remained at the periphery of the colony or community for the rest of the summer. No adult males were present on study sites after mid-August. The last Columbian Ground Squirrel recorded was seen on 14 to 17 October (1976) and 21 October (1977) at

very low elevations (ca. 1550 m). Direct observation or evidence of predation was limited but both species of eagle, Red-tailed, Rough-legged and Marsh Hawks on autumn migration and all three species of Accipiters were noted at least periodically at ground squirrel ranges. Mammalian predators included Coyote, Wolf and Short-tailed Weasel; Grizzly Bears tear up the grass and flower matte over large areas of high subalpine meadow in hunting this ground squirrel.

Mantled Ground Squirrel, *Spermophilus lateralis* (Say): Although the Mantled Ground Squirrel was found over the entire region, it was nowhere numerous. A general preference for rocky and gravel areas was noted - abandoned gravel pits, edges of creek washouts, rock slides and slump slopes or fans. In these areas the species was found in association with the Mountain Chipmunk, occasionally with Pika and infrequently with Columbian Ground Squirrels. No specific preference in food selection was noted; the species was found feeding on *Dryas*, dandelions, sedges, grasses, sorrel, fleabane and many other herbs. Remains of one Mantled Ground Squirrel were found in the pellet of an unidentified raptor; the Short-tailed Weasel was frequently seen, and fecal groups found, in association with this ground squirrel. Goshawks were noted following them on two occasions (1978).

Red Squirrel, *Tamiasciurus hudsonicus* (Erxleben): This tree squirrel, like the Mountain Chipmunk, is found to treeline or near it, in every kind of forest throughout the region. In the Upper Kananaskis area, the squirrels exhibit various stages of intergradation between the race *Tamiasciurus hudsonicus richardsoni* (Bachman) from the south and *T. h. columbiensis* from the north and northwest. The southern race in typical form is a dark olive-gray with much of the outer tail black. The northern race is redder and with only a slight black tip to the tail. Most individuals in the Kananaskis are more closely-related to *columbiensis*. Studies conducted in October-November 1976 showed that peak populations of this squirrel occurred in the older coniferous forests which had medium deadfall and some early regrowth of pine, fir or spruce/fir, but numbers were high even in relatively open young and medium pine woods. Since coniferous forest is the dominant tree cover, the squirrels feed principally upon the cones of pine and spruce. However, large quantities of mushrooms *(Boletus spp.)* were stored in trees to dry; in a few cases, tracks of the squirrels led to unpicked mushrooms covered by snow, which the animals excavated and ate or packed away. Winter food items consisted almost exclusively of cones, harvested from areas where bare ground occurred below trees, or dug up from stores, and of mushrooms from stores.

Flying Squirrel, *Glaucomys sabrinus* (Shaw): This species usually goes undetected even during extensive studies; it was encountered commonly in the Kananaskis area, occupying young pine woods, mature mixed coniferous and dense old (disclimax) spruce woods with heavy deadfall; it did not appear to frequent the dense fir forests along the southern slope of the region. Many external tree nests or drays were found; an inspection of abandoned woodpecker holes and dead tree trunks produced no Flying Squirrels, however. The drays were usually 3 to 5.5 m above ground, although higher ones may have gone undetected in the old coniferous stands. The animals descended from the trees regularly to feed or travel on the ground. Little breeding information was obtained: an adult female, with an undetermined number of young, was discovered in a dray in young pines ca. 3 m high (5/7/76); a male specimen (23/6/76) was in sexual decline. Cottage owners at Kananaskis Lakes stated that these squirrels often took residence in, or passed the day at, bird houses, and were not infrequent visitors to feeders during the winter months.

Beaver, *Castor canadensis* Kuhl: This species has played a formative role in the topography of the region; dams of considerable age, long-abandoned, are responsible for many of the marshes and wet meadows or fens in the upper valley east of Lower Kananaskis Lake. Meanders of the major streams, Pocaterra and Boulton (south on the latter into Elk Passes) show this influence. Beavers are still active in the lower Boulton Creek, and in the mouth of Pocaterra where extensive marshes are formed partly by Beaver damming, near the confluence with Lower Kananaskis River. Populations are generally small, and there are few records from medium and higher elevations. Part of a skull was found on the lower slopes of the Elk Range (East Elk Pass). The available aspen at Beaver sites is either limited or exhausted, and at Boulton Creek the Beavers utilize the willow, and in spring through autumn, grasses, various shrubs, and some wildflowers, for their leaf, root and bud or bark portions. Pine is used to some extent in construction. In Mud Lake vicinity much rose had been cut by this species, and buffalo berry and juniper were both found in construction. The largest population consisted of at least 7 adults (including 2-year-olds and older) with 3 kits (1976). Kits were appearing briefly near the lodge in late July. Two instances of predation were noted, one by Wolves, the other by an unknown carnivore.

Deer Mouse, *Peromyscus maniculatus* (Wagner): Found commonly over the entire region, with centres of population in more open and mature coniferous woods, and near rock slides, slump slopes, boulder fields. Found to at least 2630 m elevation, utilizing settled rockslides and moving some distance down-slope to feed on vascular vegetation. Breeding was at peak in mid-June, and until mid-July gravid or lactating females were the rule. Few lactating females were found in August, and most males were past breeding conditions at this time. The maximum number of embryos recorded was 4 (1976) and 6 (1978). Few sites of high population were found. Remains of Deer Mice were noted in fewer than 15 per cent of raptor and Coyote pellets examined in 1976.

Bushy-tailed Wood Rat, *Neotoma cinerea* (Ord): This species was seldom encountered unless deliberately sought; but in specific investigations, it was discovered everywhere, thinly populating the valleys and the lower forested rock-slides, and a few sites of relatively hihg population were found in gorges and at the bases of cliffs along the Opal Range and in Upper Kananaskis region. Many sites were remarkable for the extent and size of food stores; in an outbuilding at Boulton Creek cabin an estimated 49.8 kg of food (110 lbs.) consisting of cuttings from grasses, sedges, rose, grouse berry, buffalo berry, several legums including *Hedysarum* and *Oxytropis*, fronds of pine and spruce with cones, branches of currant *(Ribes)* and juniper, some mushrooms including *Boletus edule* or a similar *Boletus spp.*, were stored in an abandoned hay-bin, on a loft in the attic, and in underground shallow burrows near the building. A few examples of scorpionweed, *Phacelia sericea*, were found in one small store, with some foliose lichen *(Peltigera)* and much raspberry cutting. Stores and dens were found from 10 to 25 m high on vertical walls in Whiteman Creek and other gorges. An immature about 1/2 size was noted on 19 August (1978).

Red-backed Vole, *Clethrionomys gapperi* (Vigors): For the most part this forest vole was sporadically and thinly distributed in the region, with highest populations at lower elevations. In Highwood Pass, ca. 2230 m, the Red-back was found on the west side of the pass in fir, but not on the east in mixed fir/larch and pine. Greater numbers were found in mature fir or mixed coniferous situations with deadfall or moss matte. It was rare or absent in many pine and mixed woods. Foods, from stomach analyses of a few specimens, in-

Mountain Goat pair. Photo by Jim Salt

cluded stones of native berries and fruits (currants, et cetera), seeds of Arnica, juniper, *Vaccinium spp.*, and grasses, fir and spruce. Leafy matter was eaten but not stored. A peak in breeding occurred in late June and early July; by 10 July (1976) post-lactial females were the rule, and immature animals about 2/3 to 4/5 grown were found until early August. Whether the breeding season is actually this restricted is not known, but probably the spring season is more active than studies indicate.

Northern Bog Lemming, *Synaptomys borealis* (Richardson): Collections and live-trapping revealed this species to be at least present, and in some cases relatively common, in willow/birch fens, at mossy seeps, in more open dry high elevation fir/larch slopes, and in low damp to dry marshes of lodged grass, reeds and willow. An adult male had testes partly retracted on 2 July (1976); a male in high open woods had fully scrotal testes on 26 June (1978); males in mid-July showed no sign of sexual activity. Grasses were eaten for the leaf, and long grass snipped, and the seedheads taken. Faces were always a bright green colour and contained leafy matter.

Heather Vole, *Phenacomys intermedius* Merriam: Rather common over the region, found in dry and damp willow and grassy old dried marshes at low altitudes, and up to above 2600 m near Highwood Pass. Also found in damp seeps in fir and spruce forest (Elk Passes). At its highest elevations the species occurs most often in association with dense mattes of heath, Ericaceae, snow willow *(Salix nivalis)* and in open lightly vegetated areas by rock slides or talus and settled scree or boulders. Winter fecal piles or toilet middens were common at higher elevations (above ca. 2300 m); and in addition to these often prominent middens, examples of the voles' digging or mining in clumps of moss campion *(Silene acaulis)* were frequent. Foods are seasonal and altitudinally dependent, including seeds and leaf of many species. Predation included one example taken and partially eaten by a Pygmy Owl; skull fragments in feces of Coyote, Marten and Short-tailed and Long-tailed Weasel, and in pellets of Great Horned Owl. Adults were in breeding condition from late May through early July (1976, 1977, 1978) and not afterward.

Muskrat, *Ondatra zibethicus* (Linnaeus): Rare in the region generally; occurred uncommonly in lower ponds, including those of Beaver along major streams. No evidence of occupation at medium and higher elevations was found.

Richardson's Vole, *Arvicola richardsoni* DeKay : Found in marshes, seeps and fens, along stream edges and generally where vegetative cover and wetter to soaking ground occurred at medium and higher elevations; uncommon at lower elevations. The status, and elements of life history of this vole in the Kananaskis have been discussed elsewhere (Salt, 1978). In a few sites it was abundant, and could be found without appreciable vegetative cover and in atypical circumstances, such as on drier open slopes near and above timberline. Peak of breeding appeared to be in June (1976, 1978). Immatures foraged on their own and established their own burrows and dens when about 1/2 grown. Food are quite varied, including stems, leaves and roots of many grasses, sedges and wildflowers or herbs, and buds, bark and roots of willow, the barks and roots being principally winter foods. In winter the voles in some sites create extensive feeding burrows just beneath the surface of the ground, and leave long winding tubes of earth, worm-like, similar to those of the Pocket Gopher on the prairies.

Meadow Vole, *Microtus pennsylvanicus* (Ord): Uncommon to rare, and found only at lower elevations, in damp marsh or bog, with long lodged grasses, dead tangled willow and clumps of living willow. Only two specimens of this vole were taken

in all the live-trapping and collecting during 1976. Some extensive runways attributed to the species were noted, but trapping yielded other voles, and it appeared that the Meadow Vole had vacated these sites.

Long-tailed (Meadow) Vole, *Microtus longicaudus* (Merriam): Found principally in rock slide areas, boulder fields, long grass meadows and damp marsh edges, and, occasionally, in high open meadows and mature woods with deadfall. One individual was encountered while crossing a precarious logjam on the Upper Kananaskis River. Specimens from the region taken periodically from 1954 to the present indicate a peak of breeding which ends in late June; young recently weaned are still found in late July. Subadults were recorded in sexually active condition in late June, however, indicating an earlier (April-May) breeding as well.

Western Jumping Mouse, *Zapus princeps* J.A. Allen : Encountered occasionally in rather specialized environments, principally along stream or marsh edges in either long grass or other dense vegetation, or in forest with such shrub growth as alder, willow and *Menziesia*, and little cover on the needle or leaf and lichen matte. Other investigators found it in the Highwood Pass region. This mouse appears to have a brief season in the Kananaskis; it has not been recorded before mid-June and seems to disappear into hibernation before mid-September. Between late June and late July a number of individuals were found abroad diurnally, but the hours of peak activity are pre-dawn to about two hours after sunrise, and some time after sunset. Breeding is highly concentrated in the region, and all adults examined after late June were in sexual eclipse; a well-grown immature or subadult taken 14 July had testes enlarged and scrotal, suggesting potential sexual activity. Foods were vegetal, largely grasses and seeds of small wildflowers and forbs (knotweed, et cetera). No evidence of predation was noted.

Porcupine, *Erethizon dorsatum* (Linnaeus): Porcupines were noted in extensive aspen and willow tracts along the Upper Kananaskis River; 4 animals, all in trees, were discovered within 4 km of the narrow valley in June 1976 (E. Gunderson, R. Jaeger, pers. comm.). Elsewhere, the species was scarce, and only a few sight records were collected, well-distributed over the Kananaskis basin and to an elevation of 2100 m in open subalpine. Extensive winter surveys produced only two track records.

Coyote, *Canis latrans* Say: The only canid which occurred as entirely resident in the region (Wolves were partly transient). The presence of Coyotes was often noted, by visual observation and sign at lower and medium elevations. There was little evidence of them at high elevations. They hunted and travelled the valley bottoms, fens and marshes, and stream courses. Fecal analyses over a period of 3 years indicated that while the staple of the Coyote's diet was voles - Long-tailed, Heather Voles and other microtines - and ground squirrels, the species also feeds occasionally on ungulates. The form in which these remains occurred, however, suggested that the Coyotes depended on the kills of other predators, and scavenged. Vegetation was common in the feces dating from later winter, and included large wads of cattail *(Typha)* with other coarse grass-like plants, woody fragments and bark shreds. Bird remains were extremely rare in feces; amphibian remains occurred in 3 groups. The rarity of the Coyote in some outlying regions, such as the Upper Kananaskis valley, and at the higher elevations, may be due to competition with larger carnivores such as Grizzly Bear and Wolf.

Wolf, *Canis lupus* Linnaeus : Evidence of this species was principally indirect, (track, feces) but calls were heard occasionally. The majority of records

Red Squirrel at Moose antler. Photo by Jim Salt.

concerned 1 or at most 2 Wolves travelling together; they remained in the more remote parts of the Upper Kananaskis, Opal Range, and Smith-Dorrien. Ungulate remains were found in a high proportion of Wolf scat-groups examined - ca. 65 per cent - but much of this was undigested dried tissues indicating a good deal of scavenging, possibly of old kills and of the infrequent kill by a human hunter. Snowshoe Hare, Columbian Ground Squirrel, voles (Long-tailed, Deer Mouse) and grouse, with a very low percentage of other avian remains, were all noted. No breeding or life history information was acquired. An adult female was noted travelling with a young pup on 18 August (1977) in the Smith-Dorrien region.

Red Fox, *Vulpes vulpes* (Linnaeus): There are various uncertain reports of this fox in the Upper Kananaskis basin, including one by Kananaskis Park Rangers who were unable to verify their identification to their satisfaction. Tracks of Red Fox were noted north of King Creek (January 1978). However, the extensive winter sutdies of 1976-77 produced no conclusive evidence.

Black Bear, *Ursus americanus* Pallas : Seasonally rather common in the lower and medium elevations, but scarce or absent at most higher elevations; but Black Bears used such passes as South Kananaskis and Highwood, in common with Grizzlies, in early spring travels. Through the summer, most records of Black Bears came from the camp sites near Kananaskis Lakes, and from the Smith-Dorrien Valley, Kent Valley and Elk Passes. The autumn movements of the species were not well-documented, but bears apparently moved back to hibernation sites beginning in early to mid-September and were gone by late October. Foods were diverse, from fecal analyses: baneberry, grouse berry, blueberry, raspberry, strawberry, currants, and some other wild fruits formed much of the later summer and autumn diet. A great deal of vegetation, including dandelion, was taken during the summer. Remains of grouse (Franklin's) were found in one fecal group; human refuse such as paper, string, et cetera, was only occasional or uncommon.

Grizzly Bear, *Ursus arctos* Linnaeus : Noted by sight-record and by sign and track, in medium to high elevation sites over much of the more remote area, including the walls of Smith-Dorrien Valley, Upper Kananaskis Valley, the high open subalpine meadows on the Battleship group and Kananaskis and Spray Ranges. Foods included much vegetation, some ground squirrel and other small mammal material and, rarely, avian remains. The feeding patterns of the Grizzly here keep the animals at higher elevations for the summer. They appear to move into or across the area in May or slightly earlier, and were found (usually by sign only) at medium or lower elevations prior to mid-June in a few cases. The Grizzlies do not appear to leave the high regions again until late September, except in the case of extensive wanderings to other regions. A female with two large cubs about 1½ to 2 years of age was found high on the slopes northeast of Smith-Dorrien Valley in late June (1976). Track of a female with 1 small cub was noted in early May (1978), in Elk Pass vicinity.

Marten, *Martes americana* (Turton): Two visual records, from areas of dense young pine, were obtained in 1976. Two further sight records were made north of Highwood Pass in 1978. But sign and track of the Marten were found over much of the region, and fecal groups from 1976 to 1978 totalling about 40 specimens were analysed in the field. Red Squirrel remains were noted in one; the Deer Mouse, Heather and Long-tailed Voles, and, much less commonly, fragments of amphibians (Spotted Frog, Wood Frog) and of avian prey were found in almost all groups. Mantled and Columbian Ground Squirrels and the Mountain Chipmunk

appeared at least once; the hard cases from beetles and other insects were numerous in 4 pellet groups. Plant material was frequent, but in small quantities, ca. 5 to 7 per cent by weight or less. Track evidence in winter suggested that Martens had been hunting Pikas in higher rockslides or slump slopes north of Highwood Pass. There was little habitat specialization; woods of any type near talus or boulder fields were hunted frequently, as were mature spruce, open parkland-like aspen/pine, dense fir slide slopes, and occasionally the higher elevation open larch/fir forests.

Fisher, *Martes pennanti* (Erxleben): Tracks, with one fecal group, found during the winter (1977) confirmed that a Fisher used the heavy deadfall and watercourse of a stream flowing out of the Indefatigable-Invincible massif. Further track was found in snow in upper King Creek, Opal Range.

Short-tailed Weasel, *Mustela erminea* Linnaeus: The Short-tailed Weasel is the most common member of the mustelid group in the region, and is found almost everywhere, from the King Creek area up to at least 2400 m on Mt. Elpocacol, 2600 m or higher on Mt. Putnik, 2500 m on Mt. Kent, and 2650 m on Mt. Rae. There appeared to be a concentration of occurrence at elevations between 1850 and 2200 m. Feces were found everywhere in the valleys and wooded slopes, in Smith-Dorrien, Upper Kananaskis and associated higher valleys. Based on the analyses of about 45 fecal groups collected during the summer (1976, 1977 and 1978), foods consisted primarily of voles, with some insect material including grasshoppers, and little amphibian or avian content. Although no fecal material was analysed during winter studies, tracks of this weasel were often associated with the breathing holes and dens of voles, indicating that this is the year-around food staple. An individual Short-tailed Weasel was found attacking an immature Snowshoe Hare about 2/3 grown or less on 17 July 1976.

Long-tailed Weasel, *Mustela frenata* Lichtenstein : There was much track in winter (1976-77) and spring (1977, 1978) indicating the presence of larger weasels, and other observers and naturalists have noted the Long-tailed Weasel in the Kananaskis; but all records examined were of track, and while the species is probably occasional in the region, no direct evidence is yet available.

Mink, *Mustela vison* Schreber: Few positive records were obtained for this large weasel. One individual was noted working up the slopes of lower Mt. Rae along a dry stream-course (ca. 2150 m) in spring 1978. Winter track evidence, and toilet middens or fecal groups, placed the species at Lower Kananaskis Lake, along the Smith-Dorrien River, and on some streams west of the lakes. Little or no use was made of the lake shores. Analysis of fecal groups (8-10) revealed fragments of spines of stickleback, hair and skull fragments of voles, and the hair and bone of one shrew *(S. monticolus?)*. One toilet midden was located in a crevice at the base of high walls at marsh-edge (1976); food materials identifiable in these feces included chipmunk and voles or mice; the pellets were aged from less than 1 week to well over 12 months, suggesting continuous or repeated occupation of this lair.

Wolverine, *Gulo gulo* Linnaeus: One sight record (18/6/76) on the east slope of the Elk Range, and a few track records (1976-77) on the shoulder of Mt. Kent, in the Opals, and in Upper Kananaskis Valley (1978) suggested that the Wolverine was present in very small numbers and at more remote higher locations.

Cougar, *Felis concolor* Linnaeus: Tracks of 4 individuals, 2 fresh and 2 recent, were discovered 3 November 1976, moving from upper Whiteman Creek south and east of Mt. Wintour along the Opals, over Elpoca col, and south into the Elk

Range. The condition of the tracks allowed close estimates of time and distance involved; the cats had moved over 15 km in about 4½ to 5½ hours. Two fresh tracks in the Opal Range indicated a large immature with an adult; the smaller cat engaged in hunting exercises while the larger individual lay nearby on a vantage point, apparently observing.

Lynx, *Lynx lynx* (Linnaeus): Little evidence of this cat was found until snow cover permitted tracking (early September 1976). Across an old outwash plain or high cirque in the western Three Isle corridor, fresh tracks indicated that a Lynx had paused to investigate several communities of Columbian Ground Squirrels and Richardson's Voles. At two sites, it appeared that the cat had dug a little after the large voles, and blood sign suggested success. Fecal groups (5-7) attributable to Lynx contained primarily the remains of Snowshoe Hare and voles and mice; one also contained feathers of Franklin's Grouse. Winter track suggested that Lynx were most frequent at lower and moderate elevations in the valleys and lower forested slopes. Much of the track investigated was in sites of high hare populations. A fecal group collected from a fen near Lower Kananaskis Lake contained 30 to 40 per cent by mass coarse grasses, and a second winter pellet (1978) contained bark and twigs of a small willow. Some winter tracks suggested hunting for Richardson's Voles in small communities of that species.

Mule Deer, *Odocoileus hemionus* (Rafinesque): Frequently encountered at lower and medium altitudes, in a variety of environments, usually at interfaces between two habitats or zones. Open aspen/pine and deciduous (willow) alluvial or slide fans were favourite places in both summer and winter. But the Mule Deer is more widespread in the region than is the White-tailed Deer, and could be expected in or around marshes, fens, seeps and in any more open woods. The Mule Deer fed on graze (grasses, sedges, wildflowers or herbs) for much of the summer, but also ate some buds and leaves of shrubs such as rose and willow. Winter foods consisted of some grass and sedge pawed up from the marsh or meadow areas, but much more browse (shrub) food was taken from December through March or April. Small fawns were noted (by sight and by track) in mid-June and until mid-July (1976, 1978). All families recorded consisted of 1 fawn.

White-tailed Deer, *Odocoileus virginianus* (Zimmermann): Little information was gathered on this species, although observations were made in the lower parts of the study area, and along the head of Lower Kananaskis River and Smith-Dorrien River. The White-tail appears more comfortable in deeper forest, in this and in other Alberta Rocky Mountain locations, and was found only occasionally coming to roads, marshes or meadow-edges to feed in early morning and late evening after dusk. However, in winter the more open woods of the alluvial fans proved to be minor yarding areas for them (1972, 1974, 1976, 1977). The White-tails in this area seemed to travel almost continuously in summer, and to move frequently from one small yarding area to another in winter (January-March). Summer foods included much shrub material, from rose and willow to tips of buffalo berry and *Menziesia*, as well as herbs and grasses. Winter food seemed to consist of much shrub and some meadow or marsh plants whose lower stems and even roots were eaten.

Moose, *Alces alces* (Linnaeus): A small breeding population occurs in the lower basin region, along the stream courses and fens, and about alkaline ponds. But the animals were noted very high (to ca. 2550 m) on Mt. Rae (1978) and Mt. Kent (1977) as well as along the Spray Range and Upper Kananaskis River. The males were never obvious, and remained at higher elevation or in more remote valleys year-round, while the females with calves utilized the lower

Kananaskis Basin. Foods included both browse and graze; sedges and grasses, some rush and even cattail was used seaonally, and almost all shrubs from willow to *Menziesia*, rhododendron and smaller fir and spruce were nipped. Along little-used roads the grasses were a staple in winter, and it was noted that use of skidoos, which packed and hardened the snow on these routes, interfered with the feeding in later winter. But Moose were highly mobile until snow became more than 1 m deep in the lower areas, and the females and young in the Lower Kananaskis Lake region moved, with Wapiti and deer, onto aspen and willow west-facing slopes where snow was not deep and bare spots were frequent. The species used a high proportion of browse in summer as well. Very young calves, recorded by sight or by track, appeared with the females at the end of May and through June (1977, 1978).

Wapiti, *Cervus elaphus* Linnaeus: The Wapiti in the region appear to be greatly fragmented, and isolated in groups occupying disparate environments. Quite large herds, numbering from 37 to over 50 animals, have been noted in the past 8 years along the Elk Range (St. Clair, 1971); and along the Warspite-Invincible wall of Smith-Dorrien valley. Smaller valley groups appear never to make contact with these higher-elevation herds. The foods of Wapiti here are varied: willows, some conifer tips and aspen including (at one time) bark from larger trees, and lesser amounts of other shrubs, form a basic winter diet. But in higher meadows sedge and grass are often available for much of the year due to scouring of the ridges by wind. Summer feeding appears to consist of about 75 to 80 per cent graze (grasses, et cetera). Wapiti show little interest in *Menziesia* and buffalo berry.

Mountain Goat, *Oreamnos americanus* (de Blainville): There is a small stable population of Mountain Goats, centered along the Opal Range and the mountain wall of Smith-Dorrien Valley. A few goats are also found high in the ranges along the interprovincial boundary. Males remain in these higher sites for much of the year, but females with young, in groups of 4 or 6 to 12 or more, descend to natural sulphurous licks on Mt. Kent and near Whiteman Creek. Males were noted as high as 3015 m. The foods of the species consist of sedges at higher elevation, with some vascular vegetation such as forbs or chamaephytes where available. At the lower elevations females and young feed on a variety of grasses, herbs and even a little shrub growth. But the species does relatively little browsing. The grass species include *Agropyron, Festuca scabrella, Elymus innovatus, Koeleria cristata* and some *Bromus*. A principal sedge used by males was *Carex nardina*. Young did not appear with the females in groups until mid-July, but track evidence showed that individual females with 1 or 2 kids were present in the feeding ranges as early as 8 June (1978) and births may occur much earlier than this. The period of seclusion of the females with new young seems to be rather long.

Bighorn Sheep, *Ovis canadensis* Shaw: Evidence of the past 20 years or more indicates strongly that the Kananaskis Sheep herds are in serious decline. The animals recorded and observed here in the 1970's represent remnants of larger herds to the east. Wishart (1958) studied a major population on the Sheep River/Elbow River ranges east of Mts. Rae and Elpoca, and tracking of the Kananaskis Bighorns from the eastern sector suggests that they probably belong to eastern slope herds. They consist principally of females with new young. The sheep in this region feed by travel-grazing for most of the year, taking quantities of sedges, grasses, and shrubs including rose and willow. At one time, the high ridges of the southern aspect of the Battleship group, and some of the divide region between about 2100 m and 2700 m

Female Mule Deer. Photo by Jim Salt.

Mink. Photo by Jim Salt.

were used extensively by Bighorns, and fecal remains are thick in the sparse sedge and grass matte of the alpine zones. But most sites are now abandoned. Track and sign of 2 adults with 1 young of the year were noted on 2 to 5 September (1976) moving down from high subalpine into the forested valley bottom. The Bighorns of the region appear to use forest trails a good deal, in some areas. One lamb suckling (ca. 4 to 5 weeks old) was recorded on 18 July (1976); and a younger lamb, ca. 2 weeks old, was found on 16 July (1978). One or two rather inaccessible sites in the cliffs of Mt. Elpoca gave sign that this western face might be a lambing ground.

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NATURALISTS' BOOKSHELF

WILD BIRDWATCHERS I HAVE KNOWN

1977. Gerry Bennett. R.R. #2, Woodbridge, Ontario L4L 1A6. 102 pp. $3.95.

Reviewed by David Ealey

What do birdwatchers talk most about other than birds?? Why, other birdwatchers, of course, and Gerry Bennett's book is, if not the ultimate, at least a darned good start at analysis of this peculiar subspecies of mankind.

It is rather curious, as Mr. Bennett points out, that the subject has not been publicized more widely; it is so fascinating. And so funny! Each chapter includes a seemingly endless, loosely connected series of one-liners, bird puns, "bad" jokes (the groaner type) and tall tales about camping, social faux pas by birders, and listing experiences.

This book is not a balanced view of birdwatching, and does not pretend to be so. Occasionally irreverant toward the non-lister, the author carries on about the glory listing birds and the fun that he (and many others) derive from it. He explains several types of lists that I had never heard of before. One type that I found amusing was the list of birds "seen on and from one's backyard". Parti-

cipants go to outrageous lengths to get a bird on this list; one such lister knew that a horned grebe had been recently seen on that stretch, so he had a friend stand at the river bank, point out the grebe and then the lister climbed on top of his house with a telescope and spotted the bird!!

Some naturalists may not think much of bird listers and some listers may object to the levity with which non-listers treat them. Gerry Bennett helps the lister see the funny side of this incredible sport.

The only complaint that one might have about this book is that it is filled with the names of personal birding friends of Mr. Bennett, something that tends to repel a broader audience than the locals. But this frequent reference to his friends has enabled the author to write a very down-to-earth, friendly, humorous book.

This is a book every birdwatcher should enjoy reading - I guarantee that if the author has not drawn a word-picture that you can identify with, you will at least recognize a half-dozen of your birdwatching friends! Friends like Disdainful Dan, Alibi Al, Wally Wandersoff, etc.

The book is published by Mr. Bennett, which explains the slightly high cost of $3.95 for a small paperback. To get your copy, mail your $3.95 directly to Mr. Bennett, R.R. #2, Woodbridge, Ontario, L4L 1A6. Happy birding!

NOTE: Gerry Bennett has published a sequel entitled "More About Birdwatchers" and, as the title suggests, it is another volume of humorous birdwatching experiences.

LETTERS TO THE EDITOR

January 15, 1979

G. Vanderpolder, Director
Can. Assoc. of Zool. Parks & Aquariums
10004 - 104 Ave., 10 Fl.
Edmonton, Alta. T5J OK1

OPEN LETTER

to MaryHelen Posey, FAN Director, c/o
Virginia Lang, Editor, Alberta Naturalist

Dear Ms. Posey:

In your report to F.A.N. Members on the 42nd Federal-Provincial Wildlife Conference, Quebec, P.Q. you commented rather negatively on Col. D. Dailley's performance respecting the value of zoos in the conservation of animals. This is most regrettable, indeed! Unfortunately, I did not have the benefit of hearing Col. D. Dailley's presentation but I assure you that it is not the Canadian Association of Zoological Parks and Aquariums (C.Z.A.P.A.) appraisal of naturalists as "mildly retarded, moderately, demented persons who would set dogs, cats and goldfish loose if they could". Col. Dailley is a member of the C.A.Z.P.A. and a subscriber to the objectives of the organization, which are:

1. To promote the welfare of, and encourage the advancement and improvement of zoological parks, aquariums and related animal exhibits in Canada as humane agencies of recreation, education, conservation and science.
2. To cooperate with Government agencies concerned with the health and welfare of animals in the drafting of legislation and regulations and to respect and further provincial, national and international conditions and regulations established to protect wildlife.

The C.A.Z.P.A. is vitally concerned with animal welfare and particularly the welfare of wildlife. To elaborate on this I have included for your information a brochure which explains the purpose of zoos and aquariums, a great deal better than I can.

I sincerely hope that your appraisal of Col. D. Dailley's supposed attitude to Naturalists does not permeate through F.A.N. members. F.A.N. and C.A.Z.P.A. are striving toward similar goals although in slightly different directions. It would be most unfortunate to divide the already too weak voice of the wilderness.

Yours truly, G. Vanderpolder, Director, C.A.Z.P.A.

cc: Murray Newman, President, C.A.Z.P.A. and Col. D. Dailley, African Lion Safari

MaryHelen Posey replies: "I'm grateful for the opportunity to see C.A.Z.P.A.'s objectives and can see the relationship, in very broad terms, between them and the content of Col. Dailley's talk to the Wildlife Conference, but do not find them of direct relevance to my remarks. The degree to which the goals of the naturalists and those of C.A.Z.P.A. coincide is, in fact, the source of the disappointment with which I reported Col. Dailley's speech, as I did not find it

adequate to the requirements those goals impose.

My remarks, admittedly very energetically and informally phrased, referred, rather, to the level at which Col. Dailley appeared to feel it proper to speak. His points were generally obvious ones, too generally stated, and his manner appeared to me that of someone expecting opposition on a scale quite beyond anything encountered in that group.

It is true, of course, that his audience was not necessarily composed entirely of naturalists, and his speech might have been quite different had he specifically addressed naturalists, but it is also true that the questions put to him suggested a wish on the part of others present for much greater detail and specificity.

* * *

December 18, 1978

Re: The following articles in Vol. 8 No. 4 -

- "Alberta Naturalists: Dr. Henry George" by Dorothy Broadbent; and
- "A Nest of Richardson's Owl" by A.D. Henderson, reprint submitted by N.G. Kondla

Although both of these articles contain some interesting material I found both of their references to the "taking" of birds' nests disturbing. Only the first article contained even a mild condemnation or, better phrased perhaps, concession of the possible undesirability of such a practice.

Granted that these are vintage references I have personally been exposed to an egg collector as late as 1965. I have no doubt some individuals (aside from licensed scientists) are active in this disgusting "hobby" today.

I feel that the "Alberta Naturalist", upon publishing articles that may be interpreted as encouraging practices which are illegal and presumably contrary to the objectives of F.A.N., should clearly state its view on the issues.

Yours truly, Doug Collister
5202 Dalhousie Drive N.W., Calgary, Alta. T3A 1B5

* * *

December 1, 1978

Dear Virginia:

I would like to comment on the article "A Nest of Richardson's Owl" that appeared in the Alberta Naturalist, Dec., 1978, Vol. 8 #4:

Perhaps my thoughts are irrelevant when conservation of wildlife is the thinking today as opposed to collecting and the unrestrained hunting of earlier days on the prairie.

I do not especially like reading of the exploits of some of the "naturalists" of earlier times, as usually the settlers were collectors of wildlife in one way or the other as was A.D. Henderson on the day he set off to examine the owl's nest.

A.D. Henderson, like hundreds of others of the time was probably a collector of wildlife generally and proud, that at least in this instance, he was able to reach the owl's nest, to disturbing the parent bird at length in order to take photographs, then gathering the three eggs "where they are now in Mr. Barne's collection". He also seemed to thoroughly enjoy, as he called it, "the collecting season".

Although the early naturalist/collector has since passed from the scene, I cannot help but ponder the fact that the collectors of wildlife, of nests, then, contributed to the gradual disappearance of wildlife on the Plains, although in

our time, loss of habitat is the critical issue - the last frontier for wildlife.

In conclusion, articles such as this, do not lend to positive reading for today's naturalist, neither are they suitable reading for young people interested in natural history.

The account by A.D. Henderson and his egg collecting, though written many years ago, leaves a sadness within when reading of man's unrelenting persecution of wildlife then; but at the same time, with man now having better understanding of the environment and earth's creatures, I must confess to having a more, but cautious feeling of optimism for the future of wildlife on this planet.

Yours sincerely, Cathy Osborne
1335 Northcote Road, Calgary, Alta. T2K 2K6

* * *

January 1, 1979

Dear Ms. Lang,

Re: "A Nest of Richardson's Owl" (reprinted in AN 8: 219-220, December, 1978).

On my first (admittedly quick) reading of this article I was quite incensed that egg stealing and nest destruction should be presented by AN without editorial comment, the implication being that such a practice is acceptable. In my opinion and hopefully in the opinion of all FAN members, it is definitely not acceptable. In most cases I would consider it to be downright immoral. (An article on the current Canadian and/or Alberta law on this area would be most interesting.)

My anger subsided somewhat when I finally noted that the crime was committed over 60 years ago in less enlightened times, still I would have been happier if some comment had been appended.

AN readers may be interested in the article "To Catch an Eggnapper" in International Wildlife, November-December 1978. An egg thief ("collector") is quoted as saying, ". . . the object. . . is not to make some contribution to science. The hunt is the thing."

Sincerely, Bill Lee
5132 - 106A St., Edmonton, Alta. T6H 2W7

PS - The new method of stapling AN is most welcome.

* * *

Re: Dr. Henry George

I read with interest Dorothy Broadbent's excerpts from Dr. George's bird notes in the Innisfail Standard of 1898, concerning the Golden Eagle and Bald Eagle. I trust that further excerpts will be published.

On 1 June 1896, Dr. George made an all-day trip with his rancher friend, William Geary, to six small lakes 12 miles southwest of Innisfail. Both men were egg-collectors, and they left by horse and team at 4:45 a.m. At the lakes they found two nests each of the Common Loon, Pied-billed Grebe, Mallard, and Red-winged Blackbird, and one nest each of the Canada Goose, Spotted Sandpiper, Bronzed Grackle and Coot. (Greary, The First of June in Alberta. Oologist 14: 23-25, February 1897).

Dr. Henry George came of a medical family. His grandfather had been a student at St. Bartholomew's Hospital Medical School in London, and his father and an

uncle were surgeons in England. Dr. George himself attended St. Thomas' Hospital in London and obtained his medical degrees in 1886-87. He served as Assistant Surgeon to the Metropolitan Police in London for a year, then came to Calgary as Assistant Surgeon to the North West Mounted Police, moving in that capacity to Fort Saskatchewan in 1891. From 1893 to 1907 he practised at Innisfail, and from 1907 until 1922 he practised at Red Deer, moving to British Columbia because of ill health. (H.C. Jamieson, Early Medicine in Alberta. Edmonton: Douglass Printing Co., 1947).

- C. Stuart Houston
863 University Drive, Saskatoon, Sask. S7N 0J8

* * *

(Editor's note: Many kind comments were received regarding the last issue of the Alberta Naturalist. We thank those of you who took the time to write.)

TRIO-MUSSELMAN MARTIN HOUSES

The original Trio-Musselman Purple Martin Houses are now available to Albertans.

These well-designed martin houses, white with green baked enamel finish on lifetime aluminum, are lightweight (about 9 pounds) for easy raising or lowering.

Guardrails, doorstoppers and Universal Mounting brackets included. Price (12-compartment house) $72.95 (+ $2.95 postage before April 1). 12½% discount to all members of FAN, Edmonton Natural History Club and Edmonton Bird Club ($66.79 including postage).

FOR FURTHER INFORMATION CONTACT

Eva Dannacker
Site 37, Box 7, R.R. #4
Sherwood Park, Alberta T8A 3K4

Phone: 922-3928

(paid advertisement)

FAN NEWS

FAN SPRING MEETING, LETHBRIDGE

The spring FAN meeting is to be held in Lethbridge May 19-21, 1979, at the Lethbridge Community College south of the city. (If approaching from Highway #3 west, take Scenic Drive (by-pass) around the city to the south. Take the first right turn after the 20th Street Exit. Follow "FAN" signs.)

The schedule for the week-end is:

Saturday, May 19 - 10:30 am, FAN Executive Meeting, Rm. 124, Kate Andrews Building, L.C.C.; field trip, bring lunch, meet at parking lot north of the college. Dinner with Lethbridge Naturalists' Society hosts (to be arranged at time of registration). 8:00 pm, evening program, Morley Barrett, Regional Wildlife Biologist, "The Ecology of Pronghorn Antelopes in Southern Alberta", Rm. 101, Kate Andrews Building, L.C.C., followed by refreshments and social hour.

Sunday, May 20 - 6:00 am, early morning birding with Lynn Richards. 9:00 am, "Southern Spring" tour with Gordon Ross and Duncan Mackintosh, including stops of archeological interest with resource persons. Bring own lunch, return to Lethbridge by 5:00 pm. Dinner with LNS hosts or on your own. 8:00 pm, guided walk in Nature Reserve, or free evening.

Monday, May 21 - 6:00 am, early morning birding with Alan Roberts. 9:30 am, field trip until noon, then return home.

Public campgrounds are located west of Lethbridge on the Oldman River and in Lethbridge near Henderson Lake and Exhibition Grounds. Private trailer space (self-contained units only) is available at Kuiper's farm as well. Billets in LNS members' homes is available and encouraged. Motel accommodation can be found on Mayor Magrath Drive, as well as restaurants. For details contact Mrs. Doris Rhodes, 504 - 7th Avenue South, Lethbridge (327-4983). A weeks notice is requested for billets. We look forward to seeing you.

FAN SUMMER FIELD TRIP, COLD LAKE

FAN's 1979 summer field trip will be held at Cold Lake, Alberta, on the week-end of June 23 and 24. We will camp at Cold Lake Provincial Park on the south end of the lake, just east of the town of Cold Lake. (Motel accommodations are available in either Grande Centre or Cold Lake, as well.)

This is an excellent area for many of the more eastern and northern breeding birds, including Short-billed Marsh Wrens, Yellow Rails, and about 19 species of warblers. We will also have a chance to look at the vegetation of our boreal forests, including bogs and fens.

Organizers are: Eric Tull, phone 436-8772 or 488-4832 (office); and Terry Thormin, phone 452-3244 or 452-2150 (office). Details will appear in the next issue of the Alberta Naturalist.

CAMP CAROLINE MEETING REPORT

FAN's winter meeting at Camp Caroline was, again this year, enjoyable and successful, in spite of extreme cold and "dead" cars. The Director's Meeting was especially productive.

The 1979 slate of officers, directors and committee personnel is as follows: President, Mike McIvor; Vice-President, Mary Lore; Secretary, Maxine O'Riordan; Corresponding Secretary, Virginia Lang; Treasurer, vacant; Appointed Directors, Charles D. Bird, John Powell, Lloyd Lohr, Bob Fisher and Mary Lore; Editor, Virginia Lang; Assistant Editor, David Ealey; Committee appointments - Research, Charles D. Bird, MaryHelen Posey; Wilderness, Parks & Natural Areas, Mike McIvor; Publications, Pat Clayton; Environmental Education, Mary Lore, Maxine O'Riordan and Mary Bailey; Endangered Species, Lloyd Lohr; Publicity, MaryHelen Posey and Virginia Lang; By-laws & Resolutions, Harvey Gardner; Canadian Nature Federation Representative, Mary Lore (Mike McIvor, alternate); Federal-Provincial Wildlife Conference Delegate, MaryHelen Posey; Public Advisory Committee, John Powell (Dorothy Broadbent, alternate); Alberta Ecological Survey Committee, John Powell; Fish & Wildlife Advisory Committee, John Powell; Auditor, Graeme Greenlee. Elected directors are listed on the inside back cover of this issue.

Annual reports were circulated by Committee Chairpersons of the following committees: Wilderness, Parks and Natural Areas; Environmental Education; Canadian Nature Federation Delegate; Endangered Species; Fish and Wildlife Advisory Committee; Alberta Ecological Survey Representative Report; Public Advisory Committee on the Environment (PAC); and Treasurer's Report.

FAN involvements, through these committees, during the last year include: support of the Hon. Hugh Faulkner's northern national parks program and his decision to grant approval in principle to the Polar Bear Pass site designated by the International Biological Program; the "public hunt" of moose and elk in Cypress Hills Provincial Park to cull herds; cross-fencing of Milk River grasslands prior to consideration of a land use plan; boat launching site proposed for Cold Lake Provincial Park; preservation of Willmore Wilderness Park; support of ecological reserve concept; attendance at National Parks conference in Banff last October; sponsored essay competition among school children; attended Canadian Nature Federation conference; contributed to "Bucks for Wildlife" fund; attended meetings of Fish & Wildlife Advisory Committee; attendance at Alberta Ecological Survey; participation on Public Advisory Committee on the Environment. In short, FAN's "voice" was heard regarding all major, and many minor, environmental issues during the last year, thanks to the hard work and time expenditure of our committee members.

OVERHEARD. . .

Seeing New England's forests falling before axe and saw, Thoreau was moved to comment, "Thank God, they can't cut down the clouds".

from Common Sense, Vol. No. 1, September, 1978

PRESIDENT'S PAGE

When I was elected president last March, Dorothy Broadbent, our past president, offered her sympathy to me and said that from her experience it would probably take at least a year for me to fully grasp the workings of our organization. It has been less than a year since I took office but unless something drastic happens in the next two months, Dorothy's prediction will be rather easily fulfilled. However this is a fascinating job and one in which failures and disappointments must be met with optimism, understanding and determination. In this report I do not intend to attempt to summarize the activities of FAN over the past year since many of these will be discussed in other reports to be presented at this meeting. Instead I will mention a few highlights from my point of view.

What was probably the worst news of the year for FAN was tempered almost simultaneously by what was certainly the best news. During the annual general meeting at Camp Caroline last March, the directors were informed that the High River Naturalists Society was no longer functioning as a viable organization. We can only hope that this situation is a temporary one and that interest in that community will be rekindled so that an active club may be reborn. At the same time the directors were asked to consider a request for corporate membership from the Trumpeter Swan Naturalists centered in Grande Prairie. The response of the directors was enthusiastic and one of Dorothy Broadbent's last and most pleasant chores as the outgoing president was to extend a wholehearted welcome to the newest member club of FAN. It is certainly an advantage to have this part of the province represented in our organization. Any of you who have been fortunate enough to see their newsletters will realize they are a very active group and I expect that we will hear a great deal from them in the future.

Our field meetings are always highlights and this year was no exception. As usual, these meetings gave members the opportunity to visit different parts of the province; to meet other interested naturalists; and to explore new areas with people who know them well. Calgary, Kananaskis Provincial Park and Edmonton were the locations for those field meetings in 1978 and the host clubs deserve a lot of credit for the effort they put into organizing them.

The choice of Camp Caroline for our annual general meetings was a good one. It provides us with the rather unique opportunity to spend a weekend together, under one roof. This results in much more sustained and intensive interaction amongst members and directors than is possible in a normal field meeting situation. The benefits are obvious, particularly when we realize that FAN is spread so thinly across the province. Communication between us is vital.

This was another successful year for the Alberta Naturalist under the guiding hand of our editor, Virginia Lang, and assistant editor, David Ealey. The use of photographs and advertisements were innovations which have improved and we hope will continue to improve the quality of our major publication.

Two other recent publications are worth noting since they represented the efforts of two of our member clubs. The Bow Valley Naturalists produced an excellent study on Vermilion Lakes in Banff National Park and the Lethbridge Naturalists' Society produced a very useful field guide to the Lethbridge Nature

Reserve. Members of each club responsible for these publications deserve congratulations.

The 42nd Federal-Provincial Wildlife Conference was held in Quebec City in June of 1978 and our representative was MaryHelen Posey. This is an important conference and one in which naturalists from other provinces are usually not represented at all. I am pleased that this was such a worthwhile experience for MaryHelen. Directors and readers of her report in the December, 1978, issue of the Alberta Naturalist will realize the value of sending a delegate to these conferences both to explain our point of view and to record the new ideas, conflicts and current trends related to wildlife.

FAN participated this past fall in the public hearings dealing with one of the most important provincial issues of the past year, management of water resources within the Oldman River basin. Our brief took an overview of water management and irrigation agriculture and concluded that planning was required on an integrated basis for the entire South Saskatchewan River watershed.

One of my greatest concerns this past year has been to try to achieve some satisfactory arrangement for handling the day to day affairs of the Federation in Edmonton. Both Lyman Matthews and Elsie Kuyt have done a tremendous amount of work for us. Lyman, in particular, has kept us going almost single-handedly for several years. It is time for us to release these people to their own lives and own priorities and for us to hire someone, if not on a full time, at least on a regular basis. I hope we can reach a solution to this situation at this annual meeting.

All in all, it has been a busy and interesting year for FAN. New directors and a new executive getting their feet wet have been helped by those more experienced. I feel that if last year was one of learning for many of us, then this year should be one in which we all get down to work. Our strength and credibility as an organization is directly linked to our membership. We should do all we can to increase that membership, to bring in people who share our interests and our concerns. I am confident that we are capable of vastly expanding our sphere of influence but that will depend on the efforts of individual members. I believe that we will continue to evolve with greater clarity, our own unique identity.

- Mike McIvor, President
President's Annual Report presented at
Annual General Meeting, January 1979

CLUB NEWS

BOW VALLEY NATURALISTS

A variety of interesting programs have been scheduled for the winter and spring season. January 25 Jenny Feick will present a slide talk on Glacier, Waterton and Kootenay National Parks. February 28 Dr. J. Spang, University of Calgary, will give a program on the geology of the Banff area. March 28, "The Kit Fox" will be presented by Miles Smeeton. April 25 Halle Flygare will pre-

sent a slide program on the MacKenzie Trail. May 23 BVN members will hold their annual "litter blitz" in a popular local area.

Planning for the Lake Louise Visitors' Centre is proceeding once again, after some delays. BVN will review and respond to the second discussion paper, soon to be released.

An Environmental Impact Statement on the twinning of 7.8 miles of the Trans-Canada Highway from the East Gate of Banff National Park will be available in February. Approximately 60 days will be allowed for review by interested persons and groups. Comments and new information will then be published and distributed. Public hearings will follow in May. Any clubs or persons wishing to receive copies of the EIS or other background information should contact Phil Paradine, Federal Environment Assessment Review Office, Ottawa, K1A OH3.

- Submitted by M. McDougall

CALGARY FIELD NATURALISTS' SOCIETY

The Natural Areas Committee are updating their Natural Areas Popular Guide, adding new scientific information and noting environmental changes.

Two meetings have been sponsored by CFNS with John Campbell, Black Diamond, as the speaker. The first meeting involved the raising of Peregrine Falcons and Merlins in captivity, a most fascinating presentation.

CFNS is sponsoring five national Audubon films this 1978-79 season. Ed Jones, photographer and naturalist of Edmonton, is the fifth speaker in this series, March 23 in Calgary and March 24 in Edmonton, on Kenya-Uganda safari.

- Submitted by Mary Lore

LETHBRIDGE NATURALISTS' SOCIETY

The Society had, once again, a busy and successful year. Activities included maintenance of 57 bluebird boxes, with 40 additional boxes to be placed on the trail in the coming spring. 20 goose nesting holes were completed in cooperation with the Provincial Government. The Society sponsored 14 field trips, as well. In December, the Helen Schuler Memorial Trust Fund was handed over from the Society to the City of Lethbridge. The money, $1500, is designated for providing display panels to illustrate the flora and fauna in the Nature Reserve, and for a suitable plaque in memory of Mrs. Schuler, to be affixed near the display.

The year ended with a banquet celebrating the Society's 12th year.

TRUMPETER SWAN NATURALISTS

TSNs' had a very busy and interesting year in 1978, with representatives from Ducks Unlimited, Provincial Fish & Wildlife, Forestry and the Peace River Regional Planning Commission as guest speakers as well as local naturalists with slides and movies.

We are presently in the process of having a club crest made up and are looking into ways to build up our bank account. We are trying to encourage our members to publicize our club in the hopes of attracting new members.

We are obtaining sunflower seeds in bulk this year, for re-sale to our members at a slight profit for the club and a big saving to buyers. Our annual meeting was held in January with the following executive elected: President, Yvonne MacAlister, R.R. #2, Grande Prairie, Alta. T8V 2Z9; Vice-President, Earl Stamm, Box 516, Grande Prairie, Alta. T8V 3A7; Secretary and Recording Secretary, Ellen Craig, R.R. #1, Wembley, Alta. TOH 3SO; Treasurer, Ellen Brown, Box 664, Beaverlodge, Alta. TOH OCO; Newsletter Compiler, Lorna Dahl, R.R. #1, Wembley, Alta. TOH 3SO; Directors, Earl Stamm and Yvonne MacAlister.

- Submitted by Ellen Craig

CONSERVATION NEWS

CANADIAN NATURE FEDERATION CONFERENCE

The Canadian Nature Federation's Annual Conference is being held in Montreal May 31 to June 2. The Annual Meeting is Thursday, May 31. The conference is being sponsored by the Quebec Society for the Protection of Birds.

Field trips are varied, one day to three and five days. These conferences are most interesting and educational. Field trips are fantastic as a rule, as new species of plants, birds and mammals can be observed. Make a special effort to attend in 1979. Information can be obtained from: Mrs. Brooke Wright, 9 Springfield Avenue, Westmount, P.Q. H3K 2K9.

- Submitted by Mary Lore

WHOOPING IT UP - AGAIN - IN ALBERTA

In an article published in the September, 1978, issue of the Blue Jay, Ernie Kuyt has some good news for those concerned about the plight of the Whooping Crane. For the first time since 1914, a nest of the Whooping Crane has been found in Alberta. This nest was located within Wood Buffalo National Park in May, 1977; both eggs successfully hatched, one beneath the true parents and the other beneath foster Sandhill Crane parents.

- Submitted by David Ealey

PRESERVATION OF NATURAL LANDSCAPES IN ALBERTA PETITION

FAN is cooperating with several organizations (Alberta Ecological Survey, Alberta Fish & Game Association, Alberta Wilderness Association, National and Provincial Parks Association of Alberta, Sierra Club of Alberta) in circulating and gathering signatures on a petition to the Alberta Government. A copy of this petition, with signing space, can be found on the last page of this issue. We ask FAN members tear this page out, collect signatures (if only your own) and return them as soon as possible to FAN, Box 1472, Edmonton.

FALCON BIRTH HERALDED

The nearly-extinct Mauritius Kestrel has been raised in captivity for the first time, giving rise to hopes the species may be saved from oblivion. The small falcon is native to the island of Mauririus in the Indian Ocean. In 1974, only four birds could be found in the wild and two in captivity. The kestrel population of the island had declined due to a loss of habitat and nest predation by monkeys. Authorities estimate 18 kestrels are surviving in the wild. Another five are being held in captivity, excluding the lone fledgling.

The island os Mauritius holds a special distinction because it was on this island that the dodo became extinct in the 1600's, the victim of club-wielding sailors.

- Saskatoon Star-Phoenix, Dec. 5/78

OPPOSITION TO MORESBY ISLAND WILDERNESS

The Chief Forester for Rayonier Canada (B.C.) Ltd., Andy Anderson, and the International Woodworkers of America are opposing establishment of the proposed wilderness area on southern Morseby Island in the Queen Charlottes, claiming more than 1,000 forestry-related jobs (and $36 million circulating in the province) would be lost if the area were protected. Anderson said there are about 214,000 acres outside the company's tree farm licence that could be used for a wilderness area. IWA spokesman Ben Thompson said the union supports the idea of parks. *(Ed. - Honestly, folks, he really did say that!!!)*

- Portage la Prairie Daily Graphic, December 12, 1978

CALIFORNIA CONDOR RESCUE PLAN

The National Audubon Society and the U.S. Fish & Wildlife Service have agreed to develop a plan that should revive the numbers of California Condors. Recent counts indicate only 30 or so of the birds remain in the coastal mountains north of Los Angeles. Even though steps have been taken to preserve the condor's habitat, the birds have not reproduced at a normal rate. After a meeting with Audubon Society in November, fish and wildlife officials announced they would start drawing up details for a rescue plan. Whether captive breeding will be attempted is still not certain.

A recent report, commissioned by the Audubon Society and the American Ornithological Union criticized the government for its "shortsighted and unnecessarily conservative" approach to the condor problem because no plan to capture and breed them in captivity had been launched. The criticism was particularly unusual because the Audubon Society rarely advocates captive breeding.

"There is not much alternative to drastic action now," says Eugene Knoder, head of Audubon's task force. "It has been approached cautiously through the years - and the caution has almost developed into paralysis."

Andean Condors have been successfully bred in captivity, and ornithology experts feel that similar results are possible with the California Condor.

- Brandon Sun, December 9, 1978

NOTES AND NEWS

FOURTH ANNUAL LORAN L. GOULDEN MEMORIAL AWARD

The fourth Loran L. Goulden Memorial Award for outstanding work on natural history within the province of Alberta was awarded to Mr. Robert Lister at the Annual Meeting of the Edmonton Natural History Club on January 9, 1979. Mr. Lister, Honourary President of the Edmonton Bird Club, served as an indispensible assistant to the late Prof. William Rowan for many years, while the latter conducted his world-renouned experiments on influence of photoperiod on migration. However, Mr. Lister is recognized in this award primarily for his long-term role in encouraging other naturalists in Alberta through his newspaper column, his role in founding the Edmonton Bird Club, his social activities, and other means. His forthcoming book on the birds of Beaverhill Lake, based largely on Rowan's work, marks a fitting occasion on which to recognize Bob through this award. Details will appear in the next issue of the Alberta Naturalist.

HONORARY FAN MEMBER RECEIVES NWT AWARD

Recently, Dr. Dewey Soper, one of FAN's respected Honorary Members, received a certificate and plaque from Northwest Territories Commissioner Stuart Hodgson. Dr. Soper is one of only 25 people to receive such an award since its inception in the mid-60's; its purpose is to honour those individuals who have made exceptional contributions in Canada's North. Notable among his efforts were his early explorations as a field collector for the National Museum in the Eastern Arctic, including explorations of Baffin Island, Ellesmere Island and Greenland. I am sure all FAN members will join me in expressing hearty congratulations to Dr. Soper.

- Submitted by Martin K. McNicholl

BOAG CHAIRS NEW WILDLIFE GROUP

The latest news bulletin of the Canadian Society of Zoologists (Vol. 9 No. 4, 1978) reveals that Dr. David A. Boag of the University of Alberta will serve as the first chairman of a newly-formed wildlife section of the society. Dr. Boag states that he interprets wildlife in a broad sense, considering all studies of animals in field situations as representative of members of the section. As such, he considers preservation of habitats in which these study subjects live as important concerns of the section. Thus, this professional group is likely to be working in close association with naturalist groups in the near future.

- Submitted by Martin K. McNIcholl

JUNIOR NATURALISTS' PAGE

WEATHER

by Dan Bishop
Grade 5-A, Canmore School, Canmore

Weather is the state or condition of the air in terms of humidity, heat and other things.

The sun is the main cause of weather because it heats the earth. The atmosphere, which is the only reason why the earth has weather, reflects sixty per cent of the suns rays. The clouds also act as a reflector.

Solar rays that do pass through are converted to heat upon contact with the earth; the clouds and atmosphere then prevent the heat from leaving.

Every twenty four hours the earth rotates and causes the wind to blow. Winds blowing to the equator are slightly shifted by the coriolis force. They are then blowing from east to west causing the trade winds. Almost the same things causes the westerlies except the air is flowing to the poles and is made to go from west to east. Another type of wind is the convection currents. Convection currents are formed by the dense air at the poles flowing to the equator and thin air at the equator flowing to the poles. This is a constant air pattern. Different wind velocities are at different altitudes.

High pressure areas develop where masses of cool air from the poles descend on the earth. The earth's rotation makes the air spin in a clockwise motion or an anti-cyclone. Highs usually mean good weather.

Low pressure areas develop when air near the ground heats, expands and rises. The rotation of the earth makes the air flow in a cyclone or counter-clockwise motion. This usually results in bad weather.

In reading a weather map you should know the following weather terms such as:

Air Mass - is a large body of air that is about the same weather condition throughout it. Air masses may be warm, cold, dry or humid.

Front - is a strip of changing weather between two different air masses.

Humidity - means moisture in the air.

Percipitation - is water or ice in the form of rain, snow, sleet or hail.

Pressure - is the weight of the air on the earth.

Temperature - is the heat in the air.

Wind - is the movement of air.

To forecast weather you need instruments such as an anemometer for wind speed, a barometer for measuring pressure, a rain guage for measuring the rain, a thermo-

meter for the measuring of heat, a weather vane and other instruments.

That was your yearly weather report. Danny Bishop signing off. Tune in next year on the same channel. Thank-you.

MY DAY WITH NATURE

by Cathy Minor
Grade 7, Blindloss School, Blindloss

I live on a ranch right beside the Red Deer River where a channel flows. One day, I decided to take a walk down there to study the nature. I walked down the river hills and sat down beside the channel. I waited for about ten minutes, watching the twigs, sticks and logs float down. Then I saw this log that looked like it had two black little eyes. I decided it must be a beaver or a muskrat. It swam in the water, then pretty soon it went and sat along the shore. I could tell that it was a beaver. It was big. I would say that it weighed about fifty pounds. I think that it was an adult and it had a large, flat tail.

Then it went back into the water and I could see that it was swimming upstream, so I walked along the shore beside it for about five minutes. He was about five feet in front of me. I was fascinated because I had never seen a beaver so close before. He sat there eating twigs. Then he went behind an island where I couldn't see him any more. I sat there waiting for him to reappear, but he didn't. Then I saw two smaller ones coming out of the side of the bank where I thought their lodge probably was. I could not tell if they were baby beavers or muskrats because they were in the water and I couldn't see their tails.

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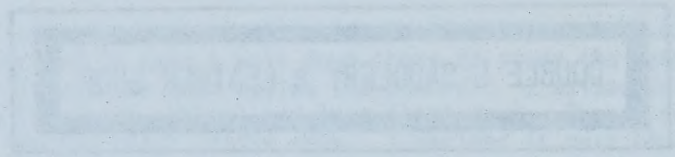

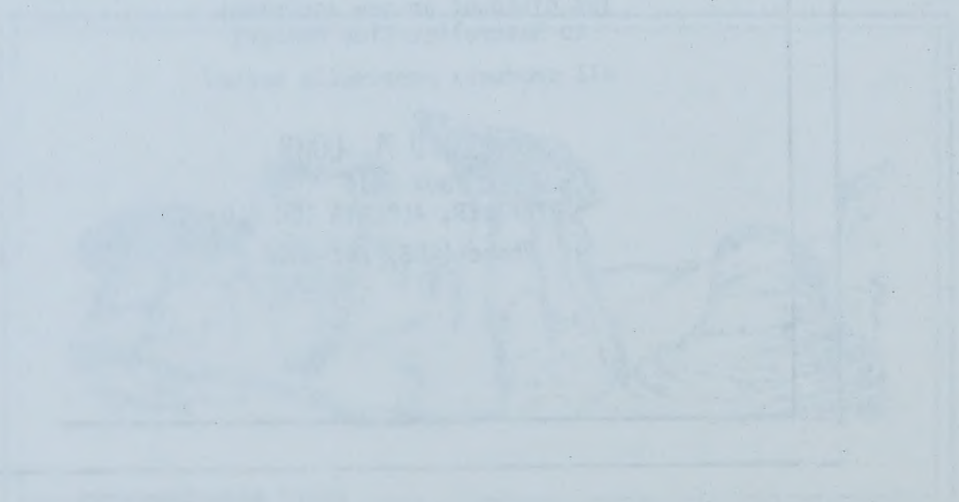

A PETITION FOR THE PRESERVATION OF NATURAL LANDSCAPES IN ALBERTA

Whereas natural landscapes are rapidly disappearing in the Province of Alberta, and

Whereas once natural landscapes are destroyed or severely disrupted, they are not replaceable, and

Whereas there are numerous natural regions in Alberta which do not have large protected natural landscapes,

We, the undersigned, in the interests of preserving a significant aspect of our heritage, do hereby request the Alberta Government to designate and preserve a comprehensive system (ecological reserves, wildlands, and parks) of large natural landscapes which: will represent the tremendous variety of Alberta's natural landscapes, flora and fauna; and will be kept free from the surface disturbances associated with resource exploitation and uncontrolled use.

Name	Address

(cut along dotted line, sign and return to FAN)

Return to: Federation of Alberta Naturalists
Box 1472
Edmonton, Alberta T5J 2N5

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DEADLINES for submission of material are: January 15; April 15; July 15; and October 15. Please include your mailing address and telephone number. All maps and charts should be submitted on 8½ x 11" (or 8½ x 7") white bond. Please indicate in light pencil any data which is to be typed on charts, maps, etc. Black and white photographs, slides or drawings are welcomed.

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